

THE
LARYNGOSCOPE.

VOL. XXXV

OCTOBER, 1925

No. 10

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding
(that they are contributed exclusively to THE LARYNGOSCOPE.)

**THE TEACHING OF UNDERGRADUATE
LARYNGOLOGY.***

DR. L. W. DEAN, Iowa City, Ia.

It is with a proper feeling of pride that I convene the Forty-Seventh Annual Congress of the American Laryngological Association. It is a sufficient honor to be a fellow of this august body. This Society has done more than any other association to advance modern laryngology. It has done so because of the particular type of men composing this group. They are men with practical laryngological ability. They have the firm foundation of internal medicine and pathology. Each has the research type of mind. It is impossible for this association to be other than a research body. To be chosen president by such a group of men is the greatest honor that has or will come to me.

A careful study of the discussions of the last few annual meetings of the association of American Medical Colleges will convince us that the curricula of the various medical schools today are not satisfactory. I am positive that no faculty is satisfied with the work it is doing. Most schools have the course of study in process of revision. We have been guided by regulations of the College Association, the Council on Education of the A. M. A. and the Federation of State Boards of Health. Their regulations, by eliminating certain schools and stimulating others to meet the course as

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 1, 1925.

*President's Address, American Laryngological Association, May 4, 1925, Washington, D. C.

outlined, have served a most beneficial purpose. The time has now come when the faculties of the various medical schools are studying their own particular problems, and meeting the exigencies of the situation as they deem best.

During this period of reconstruction, laryngology, with the other medical sciences, will be studied with regard to its use in the undergraduate medical curriculum. I do not believe one person in this room can definitely say that laryngology will or will not be dropped as a required study for graduation.

As to whether or not it will remain a required study rests, I believe with the members of this association. If it is proven that internal medicine, neurology, pediatrics and surgery can be taught best by association with work in laryngology it will not be dropped. A knowledge of internal medicine, pediatrics, neurology, general surgery and obstetrics will be the goal of most undergraduate medical faculties. Time to accomplish this will be so difficult to find that nonessentials will be discontinued. We know laryngology is an essential undergraduate study. The professors of internal medicine, neurology, pediatrics, surgery and obstetrics, who will be most influential in arranging the clinical part of the curriculum, must be convinced of this if they do not already hold this view. I have tried making laryngology so essential to the teaching of internal medicine, neurology, pediatrics and general surgery that the heads of these various departments would feel that it was essential to the undergraduate teaching of their particular subject. I believe in this I have been successful.

In teaching undergraduate laryngology, there are certain things purely laryngological that must be taught. For the most part, however, we should confine our teaching to the laryngological side of general medicine, pediatrics, neurology and general surgery. We must teach not only the science of laryngology but the art of laryngology. The art cannot be practiced without the knowledge. The art of laryngology I would define as the method of applying the fundamental facts of laryngology to the relief of the sick individual. It depends upon the development of thought and judgment in the individual. A century ago the art of medicine was taught in the undergraduate medical schools at the expense of the science. Today a just criticism of undergraduate medical education would be that the teaching of the art of medicine was neglected. Let us convince our students that every patient is a human being psychologically influenced by his disease. Science permits us to

diagnose an incurable malignancy. Art permits us with perfect truthfulness to encourage the individual to carry on his hopeless fight in the best possible way. By convincing him and his family that everything possible is being done, a most beneficial thing has been accomplished. When science stands helpless, art lends the supporting arm. The older laryngologists are far more proficient in the art of laryngology than the younger. The members of this association are particularly qualified to instruct both in the art and the science of laryngology. It was my good fortune and pleasure last winter to be present while one of our members consulted with one hopeless case of malignancy after another. Nothing could be more beautiful than the satisfaction the patient and members of his immediate family derived from the conference. This is the thing that is being overlooked in modern education.

Laryngology as a science is no different from internal medicine. Its development depends upon the same things as does the development of internal medicine. In short it is just as integral a part of internal medicine as is the science of gastrointestinal disease. Its progress depends upon a knowledge of general physiology, metabolism, pathology, dietetics and epidemiology. It is a wholesome thing to find metabolism, biochemistry, biophysics, epidemiology and dietetics entering the laryngological field.

Teachers of undergraduate laryngology should be clinicians and research men. They must devote the same time and energy to the teaching of and research in laryngology as the teaching staff in internal medicine gives to internal medicine. If we give this time and energy to development of and the teaching of the laryngology of internal medicine, pediatrics and general surgery, medical educators will be influenced to give laryngology more time in the undergraduate curriculum rather than less.

At all pathological and clinical conferences where the representatives of the often so-called major teaching departments are present the laryngological staff should be in attendance. By entering into discussions they keep alive the importance of laryngology to the proper understanding of the pathology of general disease. They bring up questions for discussion which the general man and the general pathologist would overlook. What can be more important in such conferences than the laryngological side of sudden deaths following operations on the thyroid? The question of laryngeal death without manifest clinical evidence of laryngeal obstruction must be considered; the symptomatology of gradual paresis of one

vocal cord may enter the discussion. The ability of the pathologist at autopsy to detect the presence of or absence of preoperation paralysis of one vocal cord might be considered. These things are strictly laryngological but general surgery and internal medicine cannot make satisfactory progress in the study of goiter without the assistance of the laryngologist. I remember a case where blastomycosis of bone of the leg was said to be secondary to blastomycosis of the larynx. A proper presentation of the subject of blastomycosis of the larynx by the laryngologist ruled out the larynx as a primary focus. In every hospital for the teaching undergraduate medicine, teamwork on the part of the staff is a most essential thing. The laryngologist is a most important member of the team and he should be present on all occasions and do his share of the work.

It is axiomatic that the laryngological budget should comparatively approximate the other teaching budgets. The budget is the constant bugbear of medical college executives, and there may be financial reasons for giving laryngology a less permanent part in undergraduate teaching than is best for the undergraduate student. In every teaching hospital, laryngology must have its proportionate share of beds. The exigencies of the teaching of the undergraduate student, and the necessity for the laryngological care of the patients demand this. Undergraduate medical students should have laryngological house cases assigned to them for study. They should examine and keep a complete clinical chart of the cases. They should have ready access to the laryngological wards at all times in order to carefully observe their cases and record their findings. In short, they should do their work in laryngology the same as in internal medicine. Naturally they must always be under the careful supervision of an instructor. I feel it is better if the laryngological out clinic is in intimate connection with the out services of internal medicine, pediatrics and general surgery. Further, the laryngological house cases should be under the same roof as those of internal medicine, general surgery and pediatrics.

At Iowa the laryngological service is housed in the same building as internal medicine, general surgery and neurology. Their out clinics are close together. Pediatrics is housed in a separate building. The housing of pediatrics in a separate building is a constant handicap to rendering the very best laryngological service to pediatrics, and to the undergraduate teaching of the laryngology of pediatrics. It is almost impossible to get the close co-operation which is

so essential and which is secured best by close contact of both out clinic and house services.

Certain things strictly laryngological must be taught the undergraduate. He must be taught the technique of examination, otherwise he will be unable to apply his knowledge. Quinsies, inflammations of the larynx, common colds and many other strictly laryngological subjects must be considered. Nevertheless, the bulk of the teaching should be the laryngological side of internal medicine, general surgery, pediatrics and neurology. Perhaps you will say that all these matters are strictly laryngological. I would not be inclined to debate this because a knowledge of general medicine is the essential foundation for laryngology and we are all, first, physicians and, second, laryngologists.

Laryngology including, as it does, bronchoscopy, esophagoscopy, certain parts of brain surgery, the plastic surgery of the throat and nose is such a tremendous subject that the undergraduate medical student must invade its realm in order to be able to grasp the science of internal medicine. However, undergraduate medical students cannot be taught all of general medicine and surgery. With the time at our disposal we must teach those things, a knowledge of which will benefit them most as general practitioners.

Requisition cases or transfer cases from the general services of the hospital furnish excellent material for teaching because they are cases which go primarily to the general practitioner. From the medical, pediatric and general surgical wards alone we secure an abundance of teaching material. Certainly most cases of headache should be studied from the laryngological side. Then come the cough cases, the goiter cases, infants with hoarse crying and adults with hoarseness, the cases with hemorrhages from the upper respiratory tract, the multitude where a focus of infection is to be sought for, the cases of difficult swallowing and the lung abscesses. Infants with fever without apparent cause, or with gastrointestinal upsets furnish a very large number of instructive cases. At times during inclement weather, it seems as if every infant in the pediatric service was a laryngological case. In every teaching hospital there should be a large number of requisition and transfer cases from the general service to the laryngological service. If this is not true, undergraduate medicine is not being taught in the best way. This material is the very best for teaching laryngology to the undergraduate student. By diagnosing and treating these cases, by assisting the general men in diagnosis, by helping in the teaching of general

medicine, pediatrics and surgery, by becoming an integral part of the teaching, hospital laryngology becomes indispensable to the undergraduate medical school.

The teaching of graduate laryngology in America is on a very satisfactory basis. The efforts of the committee on the teaching of Laryngology representing The American Laryngological Association, The American Otological Society, The American Laryngological, Rhinological and Otological Society, The American Academy of Ophthalmology, Otology and Rhinology and the Oto-Laryngological Section of the A.M.A. have had much to do with bringing about this condition. This committee had the moral support of all these societies, and exerted a decided beneficial influence on standardizing not only the required course, but the requirements for admission to graduate work in laryngology. Most of the short courses looking forward to the production of laryngologists have disappeared. Their places have been taken by courses created by members of this association who have made use of the facilities at their disposal and produced excellent courses for the teaching of graduate laryngology. We have convinced most of the universities and medical schools that the graduate instruction in laryngology was just as much the function of the university as the graduate study of pathology or any other medical subject.

Money and clinical facilities for the work have been granted by many of these schools. The result has been the creation of well balanced courses in graduate laryngology. In this connection we must not forget the influence exerted by the work that is being done by the American Board of Oto-Laryngolgy. I have been surprised by the influence that it has on the development of laryngology in the middle west. Every young laryngologist I know is preparing himself for his examination before this board, if he has not already taken it. The older laryngologists should secure a certificate from this board in order to help them in their work.

Laryngology today covers a broad field. In teaching graduate laryngology it is advisable to cover the whole field thoroughly. The curriculum must include courses in bronchoscopy, esophagoscopy, the plastic surgery of the nose and mouth, the lesions of the tongue and buccal cavity, the tumors of the jaws. The diagnosis of lesions in the neck and its surgery must be considered. Certain parts of neurology and a knowledge of certain phases of brain surgery are essential. Just as in general surgery there are certain men who are outstanding as goiter men, orthopedic surgeons, neurological sur-

geons, etc., so in laryngology there will always be laryngologists who will be outstanding men as bronchoscopists, plastic surgeons, operators in the larynx or specialists in voice, etc. It is not advisable for these subdivisions to become separate specialities, and I do not believe they ever will. Too much specialization is a bad thing. The practice of laryngology argues against the universal carrying out of such subdivisions. The exigencies of its practice prevent it. Certainly it is of great benefit to laryngology for a few laryngologists who because of particular ability along certain lines to limit their activities to a particular subdivision, and by carrying on intensive work and research in their particular subdivision to advance it materially and benefit laryngology as a whole. Such men are of particular service in handling the very difficult cases in their particular line of work. Most of us, as we grow older, limit our activities and our interest to particular lines of work. We find our capacity for work diminishing; the financial reward may not be longer needed. It is a fine thing to forward the cause of a particular subdivision of laryngology, rather than to retire and rob laryngology of this particular expert service.

The teaching of graduate laryngology must be done by each of us as we think we can best accomplish the desired end. In its final analysis it is nothing more or less than imparting to the student the laryngological knowledge that has accumulated during the ages of civilization. If the student possesses creative thought to a marked degree, he, during his lifetime, will add to this knowledge. One of the functions of the graduate teacher of laryngology should be that of detecting the few individuals with this rare ability and directing them along proper channels. The mass of laryngologists will not help in increasing this knowledge. Creative intelligence is confined to a few.

No greater compliment could be paid to any man than to be made president of this association, each member of which possesses this rare ability.

THE PROBLEM OF FOCAL INFECTIONS IN THE NASAL SINUSES.*

DR. E. ROSS FAULKNER, New York.

The great increase in our knowledge of various diseases which has accrued in the past ten years, has tended to produce a simple classification of all pathological phenomena, so that many a symptom complex formerly considered an individual disease, has been relegated to the sphere of pure symptomatology.

There have been very few additions to the number of specific infections discovered, but the manifestations of these infections in all parts of the body have been co-related and more simply classified. With our advance in knowledge, we have to abandon some of the old methods of thinking of infections, especially in the matter of attributing any constancy of exhibition either in the course of the disease, or its localization when caused by a known specific organism. Experimental studies in the predilection of organisms, and variations in character of the same organism, have given us an explanation of these variations. Thus the symptoms depend on the organ or tissue selected, as well as on the virulence of the organism and the resistance of the patient.

There is not an exact definition between local and general infections, except in few instances. Most of the local infections can, under certain conditions become general, and many of the so-called general infections produce all their symptoms from a special focus in some particular part which offers it a favorable field for development, and according to this particular localization, the whole symptomatology will vary. Thus an infection in lymphoid tissue will produce a severe toxemia from absorption with involvement of neighboring glands, while one localized in tissue proximal to large venous channels may produce few symptoms from the local lesion, but may quickly invade the blood stream with metastases in other parts. All infections must begin their course as a local process, but very few remain local. Tetanus and diphtheria are the best examples of those which remain local and produce their symptoms from absorption. Syphilis is a local infection in the beginning, but very quickly becomes general, and produces its symptoms from various secondary localizations. Most of the others can be either local or

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Feb. 28, 1925.

*Read before the Philadelphia Laryngological Society, Jan. 6, 1925.

general. Let us consider briefly how infections produce the morbid changes which follow in their train: First, by absorption of toxins; secondly, by invasion of the blood stream through the veins in the neighborhood, or indirectly through the lymphatics.

The distinction between the two processes is not always easy to determine, and many pathological effects which we formerly thought were entirely due to toxins absorbed from a primary focus, we now know to be due to the actual migration of bacteria from this focus into the blood stream, and to the production of secondary lesions. Thus Ophüls has shown experimentally that in acute glomerular nephritis developing in animals from injection of streptocci, the bacteria can be found during the acute stage. No doubt many of the chronic changes in the kidney which were formerly considered degenerative, have been initiated by bacteria of low virulence which had their source in some primary focus. Likewise, in joint lesions which were once thought to be due entirely to toxins, bacteria have been demonstrated.

It would seem reasonable to assume that organisms entering the blood stream from a primary focus could only do so during the acute stage of infection, and that symptoms from a chronic focus could only come from absorption. All residual foci, however, are subject to acute exacerbation, and during this period probably, there may be invasion of the blood stream. There is constantly, from all chronic foci, a slow absorption which produces slowly progressive degenerative changes leading to the deterioration of health. If one examines the blood of these cases harboring such a focus, they will find at first a retention of chlorids and urea, with an associated hypertension and defect in kidney function. These changes are progressive, finally producing degeneration of vessels and kidneys. Removal of the causal focus will stop these changes, and if the process has not lasted too long, will effect a complete restoration to a normal condition.

The phenomenon of anaphylaxis is in many cases due to the absorption of bacterial proteins from a focal infection. Many cases of asthma can be explained in this way. What part focal infections play in the disordered function of the ductless glands has not been determined, but some time, when some of the speculative theories in regard to the co-related function of these little organs have been abandoned, and we acquire some more exact knowledge, we may find that focal infection will be considered the greatest cause of their disordered function.

The various lesions now ascribed to the presence of a focal infection include the acute and chronic inflammations in almost all organs of the body. Thus appendicitis, nephritis, cystitis, pyelitis, arthritis, endocarditis, simple and malignant peptic ulcer, retinitis, and choreitis, iridocystitis, neuritis of special sense and sensory nerves, myositis, myelitis and pancreatitis. Many of the lesions which formerly were considered due to syphilis can be produced by a focus infected with pyogenic organisms. Thus the degenerative changes in small vessels leading to hemorrhages such as occur especially in the delicate tissues of the eye, we now know may be due to a puc focus. Probably Meniere's disease has the same etiology. I recently saw a case of Meniere's, which had also a hemorrhage into his vitreous, and had an obvious infection of his tonsils and sinuses, with a negative Wassermann. Syphilis represents a typical focal infection in its manifestations, but the primary focus always disappears, and the morbid changes are produced by secondary foci, often remaining latent for many years, a habit which they have in common with all other types of foci.

Having reviewed all these general effects from a focal infection anywhere, let us pass on to the consideration of the course and manifestation of focal infections in our special field — the nasal sinuses. The incidence of such infections in this field is extremely frequent, far more frequent than other members of the profession are prone to realize, and there is no part of the body where a focus may be more securely hidden from the detection of the casual observer.

The methods by which symptoms are produced from this localization, as elsewhere, are by absorption of toxins, and by the invasion of the blood stream by bacteria, with secondary localization. Positive blood culture can be obtained in many cases of acute sinusitis, and symptoms of infection in remote parts may appear very early. In severe cases, a septic thrombosis of veins in the neighborhood may produce a thrombosis of the cavernous sinus. This does not lead to the usual pyemic process with metastases, as the patient dies of meningitis before such a process has time to occur. The spread of infection by the lymphatics is not usually manifest unless there is coincident involvement of lymphoid tissue in the throat and pharynx. There may, however, be extension to the meninges by this route. I once saw a case of meningitis with streptococci in the spinal fluid from a sinusitis, recover after a radical operation on the sinuses. This was probably a case of extension through the lymphatics. In certain very acute cases where an osteitis is present, a true pyemia

may occur with localized collections of pus in other parts. This is most likely to happen from an acute antrum involving the superior maxillae in children.

Let us now consider the general effect on the patient from absorption in acute infections in this region. This picture presents as variable manifestations as could only be possible in such a variable anatomical field. Thus if there is free drainage, there may be very few general symptoms—fever may be only one or two degrees, and the pulse may be very little above normal. On the other hand, with insufficient drainage, especially in one of the larger sinuses, the phenomena of a very acute infection may be present. I have seen the general effect of a blocked sphenoid more pronounced than I have ever seen it from other sinuses.

The more severe general symptoms are only present during the first acute attack as a rule, and when one gets grave general symptoms from an acute attack grafted on an old, chronic sinusitis, it is well to consider the possibility of complications. Acute sinusitis with inadequate drainage continuing on through a subacute stage without much to call attention to the localization, may produce a train of symptoms which have led to confusion in diagnosis with such infections as a paratyphoid, and most commonly, tuberculosis. I have seen numerous instances where the latter has been given as a diagnosis where all the symptoms were coming from the nasal sinuses, and disappeared entirely on treatment. I always feel the necessity of warning our friends who are distinctly otologists to look out for symptoms from the nasal sinuses, when cases are not recovering satisfactorily after a mastoid operation. The differentiation between infections in the sinuses and tuberculosis can often be made by the simple expedient of keeping a four hour temperature and pulse chart. The slight elevation in temperature in sinusitis will not show the regular evening rise of tuberculosis, and will not show the rapid pulse rate so common in all tubercular lesions. Malignant endocarditis is another condition easily confused with sinusitis, especially in its early stages. The two conditions may be coincident and related as cause and effect.

We will now pass on to consider the chronic inflammations of the sinuses, and these constitute by far the majority of the focal infections as we see them. This is usually considered to mean a collection of pus in one or all of the sinus cavities. A small involvement may produce as marked an effect as an extensive involvement, the nature of the drainage being the determining factor in the production of symptoms. The amount of pus does not seem to matter

much, and in some cases with very slight secretion, the mucous membrane itself can constitute a focus from which toxic substances can be absorbed, and produce symptoms, or where the membrane has completely degenerated, and the sinus contains areas covered with granulation tissue, there is no doubt that absorption takes place. The diagnosis of some of these pathological processes in the sinuses presents great difficulties.

The history is a matter of great importance, and many times it gives us about the only evidence. A history of a severe, acute attack at any time in a patient's life may have great significance. Repeated acute attacks are still more suggestive. Attacks of tonsillitis have also some bearing on the possibility of a latent sinus focus, or the association of an infection in the tonsils with a postsinusitis is very common. An acute infectious disease such as influenza, pneumonia or scarlet fever may have initiated the sinus infection, so all this data should be carefully recorded.

A very careful examination of the nasal cavities must be made in every case—the details of such an examination are known to you all. A steady use of the pharyngoscope will occasionally yield valuable evidence, and should not be omitted, and in particular insist on more than one examination before committing yourself to a diagnosis. Bad anatomy in a nose producing blocked drainage in the region above the middle turbinates affords one some circumstantial evidence in favor of a positive finding. A culture may show one dominant organism, and the individual may show sensitization to the injected protein from this culture. If the patient has no temperature record, this should be taken at four-hour intervals for several days. The washings from an antrum, if pus is present are positive evidence of infection, but when negative, it does not absolutely deny the presence of a focus, for there may be quite marked degeneration of a membrane with polypi, and one will get no pus on irrigation. The X-ray and transillumination will help in these cases as well as the history. The X-ray is always valuable, but must not be wholly depended on, especially in disease of the posterior ethmoids and sphenoid. It is in this region that the pharyngoscope is most valuable if it is accessible, and if it is not accessible on account of the anatomy, it is "a priori" evidence that there may be a focus present. In my experience the frontal is very rarely acting alone as a focus of infection, but one can usually determine if pus is coming from the nasofrontal duct. The attempt to wash it out has not always been successful with me.

Having determined with certainty, or as it happens too often, with probability, the presence of a residual focus, our next problem is how to deal with it, and this will necessitate a general review of the whole treatment of sinusitis.

Considering that every acute attack bears potentialities of an aftermath of trouble, we must do all we can to promote the complete restoration to normal before discharging the patient. By far the majority of acute coryzas have involvement of sinuses, and in the free, open nose with good drainage, recovery will take place spontaneously. The cases which ask our advice in the first forty-eight hours of an acute sinusitis are not very numerous, but when they do, I think the best thing to do is to forget that we are specialists, and give them about the same treatment the family doctor would give, viz.: a good physic, rest in bed, Dover's powder with a little phenacetin and belladonna, and caffein, easily digested food and fruit juices. He will probably suggest dropping some argyrol in the nose with a medicine dropper, and this would be about all the local treatment which would be justifiable.

After three or four days, if there is a pronounced purulent discharge, warm saline irrigations may be given, used preferably with an irrigator on one side and a vacuum producing apparatus on the other. This may be followed by placing the patient in a horizontal position, tipping the head far back and dropping in some freshly prepared, 10 per cent argyrol. This would be about the routine treatment for cases seen also in the subacute stages. No operative interference is advisable in the acute stage. One may sometimes have to puncture an antrum, but even this is only indicated after a week or ten days when there is no evidence of drainage, and pain persists. Likewise, a frontal showing no drainage and persistent pain may require some attempt to promote drainage. This will consist in removing the anterior end of the middle turbinates, or doing a limited submucous.

In the subacute stage, after a short trial of treatment, any anatomical condition interfering with drainage will require correction. A complete submucous with or without partial removal of the middle turbinate will be sufficient usually. Occasionally the judicious use of the actual cautery, or chromic or nitric acid, will greatly facilitate drainage where the turbinates have become spongy. At the same time, if there is an obvious infection in the tonsils or adenoid tissue, these should be removed. Sinusitis in children and young adults will very often clear up after the removal of tonsils and adenoids. If, however, the condition is not making progress towards recovery

at this period, and even previously, general treatment should be insisted upon, a diet rich in fats with fruit juices and fresh vegetables, bodily rest out of doors with plenty of sunlight—about the same regimen as one would prescribe for a tuberculosis patient. Tuberculosis is in fact about the only focal infection which is treated intelligently, because in this one does not trust to local measures, but has to depend upon the general body resistance to effect a cure. If, however, in spite of all such measures, a profuse discharge continues, and the X-ray shows an involvement of antra and breaking down of ethmoid cells, an intranasal sinus operation should be done at once. No one today allows an acute ear to go on with a purulent discharge into a chronic state, neither should they allow this to occur in the nasal sinuses. Free intranasal drainage of the antra and sphenoid should be established, and complete extirpation of the ethmoids should be done. If the anterior ethmoids are properly cleaned out the frontals will usually take care of themselves.

In the cases which are first seen when they have reached the chronic state, the above outline of procedure should be followed. If, however, in both stages, such procedure causes no amelioration in the symptoms caused by such a focus, one will have to soon resort to more radical measures. A Caldwell-Luc may have to be done on the antra, and a radical frontal sinus operation performed. The sphenoid will have to be opened low into the nasopharynx, and possibly a radical operation such as I will describe later may have to be done.

In following this treatment of these foci in the sinuses, one usually finds, that with any degree of improvement which can be accomplished in the local condition, there is some improvement in the secondary condition, in an arthritis, a nephritis or whatever part is affected, but until one has entirely exterminated the original focus, they will be subject to relapses, and many of our efforts may appear failures because either the patient or doctor becomes discouraged and gives up.

This is the most difficult surgical field of the whole body, and to completely eradicate a focus involving all the sinuses is a long drawn-out affair, in which one has to employ every possible adjunct. Vaccines, I think, help in some cases, in others they do not, but they are worth trying after one is sure they have established good drainage. The various antiseptics which are recommended seem to have little effect in my experience. I believe that argyrol has a beneficial effect, not for its antiseptic value, but for the stimulation of tissue reaction it may produce against bacteria. In a region such as the eye, where

effects are more easily observed, there is no doubt that argyrol exercises a beneficial action. A method of using argyrol which has been called the Dowling method, consists of packing pledges of cotton dipped in 10 per cent argyrol in the nose, and leaving them there for an hour, and has been very highly commended by those who have used it persistently. Placing the patient in such a position that gravity will carry the argyrol into the sinus region, seems to me to give some result in many cases.

Operative procedures on the nasal sinuses vary greatly according to individual cases. In most cases a submucous has been done before the sinuses themselves are attacked. If it has not, it should always be done as a preliminary. To have a flexible septum, not only gives one much better access to the operative field, but it enables one to carry out after-treatment much better; besides it facilitates the prevention of adhesions forming afterwards. The intra-nasal operation is the method of choice where there is no indication of bony necrosis nor external frontal fistula. Of course where there is polypoid degeneration throughout all the sinuses, an external radical may as well be done at once. The various methods of radical operations are no doubt familiar to you all. In the case of the frontal, I usually prefer to pack the wound externally till it has filled up from the bottom in small sinuses, but in very large ones I leave a bridge and close the wound, maintaining pressure with the dressing to obliterate the cavity. In the operative procedure on the sphenoid, one encounters great difficulty in getting dependent drainage. Occasionally it becomes necessary to take off the floor to establish drainage into the nasopharynx. In two cases where both sides were involved, I took out the partition between the two, and took off the floor. This was rendered imperative in these cases by the fact that their sphenoids had been scraped out, and kept filling up with granulations, maintaining a focus which could never heal. In one, the granulating walls had united and left a blind cavity in the bottom, an ideal focus of infection. This operation, which you may call the radical sphenoid operation, is not so difficult. The nasal septum must be removed and cut through near its posterior border, then pushing it to one side, a fair exposure is possible. It could be done between the layers of the septum in the same way, as Cushing exposes the pituitary gland.

The operation on the ethmoids must needs be always a complete extirpation, for one cannot establish drainage in individual cells, and could not probably tell which ones to drain even if it were possible to do so. In purely local conditions, one may occasionally

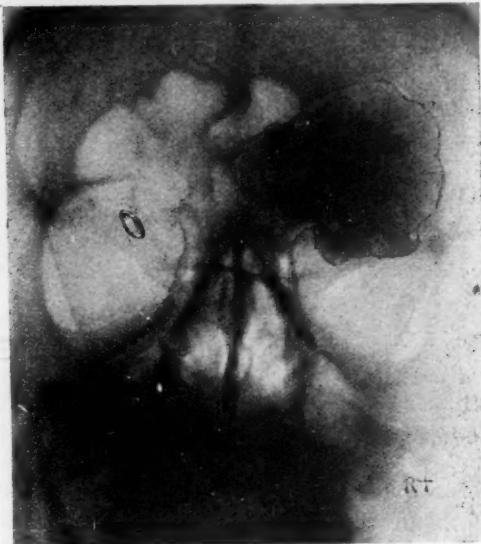
operate on the anterior group of cells, and in cases of retrobulbar neuritis an operation on the posterior cells may be all that is necessary, but where a focal infection is found or suspected, it will be always wiser to exenterate the whole group. The question of removing the middle turbinates in doing an ethmoid operation is frequently discussed. My experience would compel me to believe that it is necessary to remove it in nearly all cases if one expects to eradicate the focus entirely and create proper conditions for the space to close over with a healthy epithelial covering. I have used a method of operating on the ethmoids for years which is a modification of the Mosher method, but carried out with special instruments devised on the safety first principle, and I can testify from a large experience with cadavers, that they are perfectly safe and at the same time will open all the cells. The after-treatment requires considerable care, granulations must be kept in good condition, and as they are very prone to become exuberant, it is often necessary to scrape them off, or take them off with a biting forcep. If, after an intranasal operation a profuse discharge continues from the frontal, it is almost impossible to obtain a healed surface in the ethmoid region and the infection will continue till a radical frontal is performed.

101 East 58th Street.

OSTEOMA OF THE FRONTAL SINUS EXTENDING INTO THE ORBIT AND ANTERIOR CEREBRAL FOSSA.*

DR. HENRY M. GOODYEAR, F. A. C. S., Cincinnati.

The following patient, Mr. A. C., age 32 years, was referred to me by Dr. Henry Stanbery on Sept. 15, 1924. There was evident an undue bony prominence over the right frontal sinus. The eye was displaced downward and outward. The vision was normal and the eye-grounds clear. The excursions were not limited.



The patient complained of terrific headache, and felt as though the right side of his head was being pressed in a vise during the attacks. The tumor mass in the orbit was first noted two years ago, and had increased slowly in size. At first the headache was mild, but during the past three months had become intensely painful. There was no history of dizziness or vomiting. The patient was well nourished

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Mar. 25, 1925.

*Read before the Cincinnati Academy of Medicine, Oct. 27, 1924.

and apparently in good general health. The blood Wassermann was negative.

An X-ray (Fig. 1) revealed a large tumor mass practically filling the entire right frontal sinus, which was large. The mass also extended into the orbit; to the midline of the frontal region; laterally into the temporal bone, and posteriorly in the right anterior cerebral fossa (Fig. 2).

The intranasal examination showed the right side to be apparently normal. There was some hyperplasia in the left anterior ethmoid area.

Under local anesthesia a curved incision was made through the eyebrow and down on the side of the nose, and the periosteum to-



gether with the attachment of the superior oblique muscle was elevated and the eye retracted laterally. Another incision was made upward near the midline of the frontal sinus wall and a large bony tumor mass was exposed. A part of the anterior frontal sinus wall had completely atrophied.

With chisel and rongeur the surrounding bone was cut away sufficiently to elevate the tumor mass, which seemed to originate in the upper lateral wall of the sinus. The entire roof of the orbit was removed and the intermediate wall of the two frontal sinuses was found to have been completely absorbed. There was evident much thickening of the membrane in the left frontal but no pus. As the

tumor mass was lifted from its bed a large area of dura the size of a half dollar was exposed, showing a marked depression in the frontal lobe. There was no loss of cerebrospinal fluid. The nasofrontal opening was enlarged, the wound packed loosely with one-half per cent iodoform gauze and the incision sutured.

The patient showed very little reaction after the operation. The sutures were removed in 24 to 36 hours and the packing completely removed by the sixth day. The patient left the hospital on the eighth



day, and since the operation there has been no recurrence of headache and no undue secretion from the nose.

The tumor was of almost ivory hardness and its surface rough and nodular (Fig. 3). A microscopic section showed it to be a benign tumor.

I wish to state that the entire operation was done under local anesthesia, and at no time did the patient seem to be unduly uncomfortable except for a moment at the time of elevating the tumor mass from the anterior fossa.

Doctors' Building.

SUBLINGUAL TONSILLAR ABSCESS.

LINGUAL QUINSY.*

DR. MARGARET F. BUTLER, Philadelphia.

Modern textbooks and particularly those by American authors, make but slight allusion to the lingual tonsil, the fourth portion of Waldeyer's ring. Of eighteen textbooks reviewed less than half of them refer to the phlegmonous lesions occurring in or under it, and the majority of these are in English and German works. Even Bosworth's classic refers only to hypertrophy and varicosities of the lingual tonsil, leaving the student unaware of the serious complications which may arise from it.

According to Lennox Browne,¹ the first historical notice of the lingual tonsil was made by Vesalius in 1543. Wharton in 1685 improved upon his description of it. Schaffenberg (1704) and Morgagni (1765) refer to it, but it was not until 1852 that it was recognized as being similar to the other tonsils. In 1892 Mr. Wyatt Wingrave in England, and Rosenberg in Germany arrived at the same conclusion, viz: that though the two parts of the tongue are in immediate connection, the base differs completely from the anterior portion, anatomically, physiologically and pathologically.

In 1880 Kronenberg made the following statement: "Certainly to Lennox Browne is due the merit of having decidedly demonstrated that the complication of symptoms, which has been called *globus hystericus*, and which up to then had been considered the expression of a functional neurosis, are frequently due to real anatomic changes in the region, which had been overlooked because examinations had been incomplete."

The most satisfactory contribution that I have found regarding the lingual tonsil is the chapter in Dr. Paul Heymann's "Handbuch der Laryngologie und Rhinologie", 1899, entitled "Die Krankheiten der Zungentonsille von Dr. J. Michael in Hamburg".

Lennox Browne also makes an exhaustive study of the subject.

The histology of the lingual tonsil has not received so much attention as has that of the other tonsils. Wyatt Wingrave and Kölliker have furnished valuable contributions to the subject. Ruault states that the anatomical barriers of the lingual tonsil are very definite, extension of disease therefore is rare. The gland is intimately connected with the lingual muscle, the essential muscle of the tongue. Histologically it resembles the faucial tonsils, but the cellular tissue is more dense and skeletal muscle fibres are plentiful.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 8, 1925.

*Reference to scant attention given to study of lingual tonsil in recent American textbooks. Review of history and literature. Report of cases of sublingual tonsillar abscess.

It is probably the exception rather than the rule for the general practitioner to examine the hypopharynx in diseases of the throat, and many pathological appearances in this region are frequently overlooked.

Early in practice the laryngologist finds secretion in the crypts of the lingual tonsil accompanying acute inflammations and at times mycosis or keratosis, hyperplasia, atrophy, edema, and varicosities. We know that gummatous, papillomatous, cysts, various forms of tumors, benign and malignant, may be found here.

The hyolingual duct may remain patent and be traced from the foramen caecum in the sulcus terminalis to the middle of the thyroid gland and may carry infection thither, and dermoid cysts may develop from the foramen caecum.

Foreign bodies such as fish bones and husks lodge in the lingual tonsil fairly often and it is surprising that we so rarely have abscesses arising from this source.

Lennox Browne,² 1899, gives a very comprehensive description of abscess formation under the lingual tonsil. He quotes David Craigie who, fifty years previously, now seventy-five years ago, had described under the name lingual quinsy "an acute inflammation of the tonsil and base of the tongue, apparently a very grave disease, for one of the patients whom he saw died and three or four others who were exceedingly ill, made but a slow recovery."

Several writers state that if the suppuration extends to the floor of the mouth it may be mistaken for or constitute Ludwig's angina.

Dr. Justin Waugh³ reported a very interesting case of lingual quinsy at the meeting of the American Academy of Ophthalmology and Oto-Laryngology in 1923. In his paper he made this statement: "There have been very few references to this disease in the literature, and although I have made frequent inquiries among men interested in oto-laryngology, I have encountered only one who has had personal experience with a case similar to that reported", and followed with a case reported to him by Dr. Thompson, of Manchester, England.

Case report: Aug. 31, 1923, I was called early in the morning to see a man who was said to be choking and was apparently in great distress. I directed that he be taken to the Woman's College Hospital, a square from his home. On my arrival I found the patient, F. L., a stout, well built man, age 34 years. He was suffering from obstruction in the throat, severe pain, dysphagia and dyspnea. The condition had been developing for two weeks, beginning with sore throat, growing steadily worse. He had had pain in

the left ear for the past few days. His voice was thick, he breathed with difficulty and I surmised that he had a peritonsillar abscess.

On examination I found considerable swelling externally at the angle of the jaw and in the sublingual region to the left side. The patient opened his mouth with less difficulty than with peritonsillitis and to my surprise I found no pathology of the fauces with the exception of extreme redness and swelling of the left lateral fold of the pharynx.

With use of the tongue depressor and later with the laryngeal mirror I found a bright red mass as large as an English walnut filling the left side of the throat. On cocaineizing and palpating the mass it seemed to be attached to the whole of the left side of the base of the tongue. It gave the fluctuating sensation of an abscess. An incision was made and a great deal of thick yellow pus gushed forth and the patient was immediately relieved. Later, examination showed that there was edema of the epiglottis and swelling of the left aryepiglottic fold, ventricular band and arytenoid. At the end of a week the tumefaction at the base of the tongue had practically disappeared. Two weeks after the abscess had been incised I was called by the patient and was informed that the abscess was filling up again, but that he was not suffering so much as previously. I had him come into the hospital and I found a mass much like the one found two weeks previously, but not quite so large. The tumor-like swelling was in good form to be removed and after cocaineizing, a large mass was cut off with the wire loop.

The tissue removed consisted of hypertrophied lingual tonsil and was three-fourths to one inch in diameter and about one-half inch in thickness. There was a thin, pale, capsular membrane covering its lower, lingual surface. The patient had no further trouble.

In the case reported by Dr. Waugh, the pus invaded the deep tissues of the tongue and throat and after seven days the patient died from exhaustion. "The pathological specimen" secured post-mortem, "showed the presence of an abscess at the base of the tongue of approximately the size of an English walnut, lined with a greenish sloughing wall, and definitely connected with the base of the lingual tonsil on the left side."

In the discussion following Dr. Waugh's paper, Dr. Herman Cohen, of this city, Dr. W. W. Carter, of New York, and Dr. Pollock, of Chicago, each reported cases of sublingual tonsillar abscesses.

Dr. Cohen has very kindly turned over to me the reports of his cases. They are as follows:

THREE CASES OF SUBLINGUAL TONSIL QUINSY.

September, 1917: G. M., male, age 22 years, moulder. History of tonsillitis ten days before I examined him. After his tonsillitis

subsided, he continued to have odynphagia, which was steadily getting worse. His family physician had ordered hot gargles with no beneficial results. When he came to see me he remarked in the presence of his wife "that unless he was given relief he would commit suicide". Examination revealed an inflamed and swollen posterior third of the tongue, very sensitive to the touch, edema of the glosso-epiglottic space and of the epiglottis and diseased tonsils. There was no evidence of a retropharyngeal abscess or a Ludwig's angina. Under local anesthesia I made a deep incision into and through the right lingual tonsil. Pus immediately oozed out. Hot alkaline gargles were ordered and medicated inhalations also. The following day the patient made the following remark, "He decided to stay in this world a little longer."

May, 1922: B. P., male, carpenter. History of nine days of dysphagia, not preceded by tonsillitis but came on suddenly. Earache and odynphagia followed with increasing intensity. Was in one hospital where he was kept for two days and having had no relief he insisted on being sent out. Another physician sent him to a second hospital, where again he remained two days and then insisted he be sent home. A third physician asked me to see this patient and at this examination the patient had about ten days growth on his face, emaciated and in a word looked like a tuberculous patient. There was swelling, marked tenderness in the posterior portion of the tongue, particularly on the right side, also considerable edema in the oro- and laryngo-pharynx of the right side. Incision through the right lingual tonsil with a curved knife released considerable foul smelling pus and the next day the patient wished to go home because the nurses were not giving him enough to eat.

May, 1923: P. L. B., male. History of sore throat but no tonsillitis. Duration four days and odynphagia was increasing. Findings were about the same as in case two except not quite as bad. Incision at and through the anterior border of the right lingual tonsil permitted considerable (about two teaspoonsfuls) of pus to ooze out.

All three made rapid recoveries as is seen in peritonsillar (faucial) abscess.

ABSTRACT.

1. LENNOX BROWNE: *The Throat and Nose and Their Diseases.* 1899, p. 382.
2. *Ibid.* p. 386.
3. JUSTIN M. WAUGH: *Tr. Am. Academy of Ophthalmology and Otolaryngology,* 1923, p. 313.

1831 Chestnut Street.

PEMPHIGUS AS A BEGINNING TONSILLAR MANIFESTATION.*

DR. HENRY DINTENFASS and DR. SIGMUND S. GREENBAUM,
Philadelphia.

Dermatologists are in general accord regarding the condition referred to as pemphigus, but in the minds of many practitioners the significance of the term pemphigus is not clear. Originally pemphigus (bleb) referred to all diseases in which blebs occurred, but, as blebs in themselves do not constitute a definite disease and as the true nature of many diseases characterized by bleb formation became known and understood, these latter were removed from the general group of pemphigus. Among them were the bullous syphilitides (pemphigus neonatorum syphiliticum), bullous impetigo (pemphigus neonatorum contagious), bullous erythema multiforme (pemphigus circinatus), epidermolysis bullosa (pemphigus congenitalis), and many instances of Duhring's disease (pemphigus pruri-ginosus).

At the present time, the term pemphigus is restricted to pemphigus acutus (a severe, frequently fatal disease) pemphigus chronicus or true pemphigus, pemphigus vegetans and pemphigus foliaceous. It is very probable that the latter two conditions are but later stages of true chronic pemphigus. Further, when the term pemphigus alone is used, today, it generally refers to chronic pemphigus.

Pemphigus is a slowly progressive and usually fatal disease. Its downward trend is accompanied by marked mental depression, anorexia, fever, vomiting, diarrhea and loss of weight with death in from three to eighteen months. Although relatively rare, it is, by reason of its lethal character, one of the most important diseases with which the dermatologist comes in contact. In our experience, pemphigus terminates fatally in about 90 per cent of the cases. Of twelve patients admitted to the Polyclinic Hospital in the service of Dr. Schamberg from January, 1922, to date, suffering with pemphigus, all but one died within periods varying from three to eleven months; the tenth passed into the form of pemphigus foliaceous and is alive at the present writing. Without going into clinical

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Apr. 10, 1925.

*Read before the Philadelphia Laryngological Society, Feb., 1925.

description of the disease, it is well to remember that the following are considered evidences of severity in a given case: Primary appearance of the eruption on the mucous membrane; tendency of the epithelium to desquamate or of the epidermis to separate upon

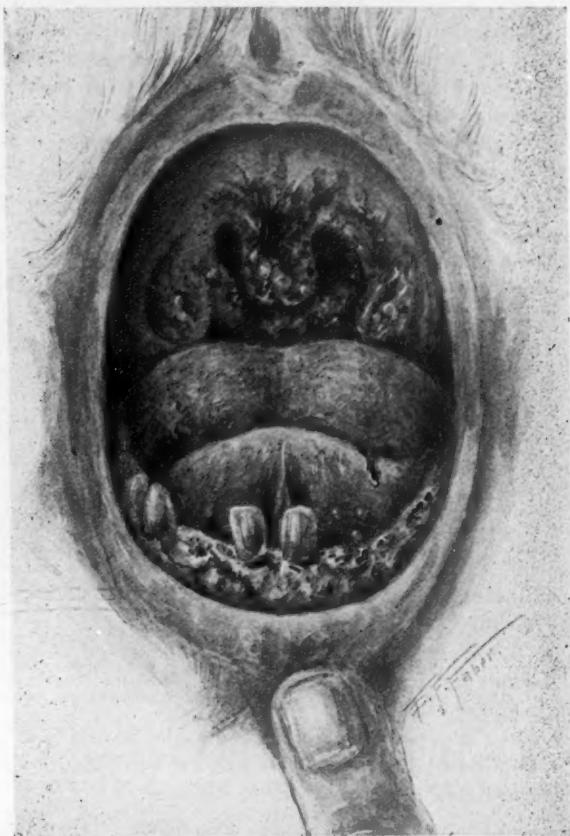


Fig. 1. H. H., white, male, Jewish, age 55 years. Pemphigus beginning on left tonsil, later involving other tonsil, pharynx, gums, tongue and buccal mucosa, at which time picture was made. Duration of condition, three months. (This is Dr. H. D.'s case described in the above article.)

the slightest trauma (Nikolski's sign); and lastly, the appearance at times of condyloma-like elevations on the skin suggesting pemphigus vegetans.

Although the initial manifestations of pemphigus on the skin and mucous membranes are the same, the clinical appearance on the

mucosa is somewhat different because of the localization. Here, as a result of the heat, moisture, and great tendency to trauma, the blebs are rapidly destroyed, sometimes within half an hour. All that one usually sees, therefore, are rounded or polyclinic (if several adjacent blebs are present) red erosions sometimes covered with a diphtheroid membrane representing the fallen bullous epithelial roof. In so grave a disease a diagnosis of pemphigus when but the mucous membrane lesions alone are present, is in most instances unjustifiable, though it must be recognized that a pemphigus limited to the mucous membranes exists. Aside from the conditions noted in the case report, one should be careful to exclude bullous eruptions of the mouth due to certain drugs, notably iodids, aspirin, and antipyrin; erythema multiforme which is, however, usually acute in its onset, and associated with cutaneous manifestations, and finally Duhring's disease, which is likewise accompanied by cutaneous lesions.

It has been suspected for a long time that pemphigus was an infectious disease. Various organisms, including bacilli, diplococci and streptococci, have been isolated from the blood by different investigators. Eberson has recently recovered a bacillus from the blood which he regards as a causative organism. Careful and repeated studies made during the past year in the Research Institute of Cutaneous Medicine by a group of men have resulted only on one occasion in the finding of a bacillus similar to that described by Eberson. On other occasions streptococci have been isolated.

Despite the usual prognosis, an early diagnosis would appear to be of great value. The recent observations of one of us (S. S. G.) appear to indicate that certain drugs being developed at the Research Institute of Cutaneous Medicine may exhibit their greatest value in beginning cases.

Our purpose in presenting this case before the Society is to point out that in the various conditions affecting the tonsil and producing throat soreness, this disease must not be forgotten.

Pemphigus vulgaris, as has already been noted, is an inflammatory disease of the skin characterized by the formation of round or oval blebs and as has been said, these frequently appear on the mucous membranes of the mouth and other mucosal surfaces. Dr. Goodfriend recently reported a case of this type in the *Dental Cosmos*. Some months ago, Dr. Henry Wieder treated a similar case.

Both of these patients were in the Polyclinic Hospital, and were included in the list already given. The case we are about to describe was one in which the affection appeared on the tonsil, without the

skin changes being present, and was the sole clinical manifestation of several weeks. This is of particular interest to the laryngologists because until the blebs on the skin made their appearance we were absolutely at sea as to the diagnosis. The history is briefly this: Mr. H. H. was sent to one of us for a difficulty in swallowing which had been persisting for several weeks. Except for extreme nervousness and constant salivation there was nothing unusual to be noticed from his external appearance. He was quite robust, although he believed that he had lost some weight recently. He was married, and the father of three healthy children. His wife had had no miscarriages. He denied venereal history.

In the examination of the throat there was disclosed a distinct swelling of the left tonsil and peritonsillar region not unlike quinsy, but with the mucous membrane of a fiery red color surrounding a gray area on the mesial aspect of the tonsil about the size of a dime. The uvulae was also considerably swollen and of the same red character.

Thinking that this was probaly one of the throat infections which were prevalent in the recent grippe epidemic, hot alkaline gargles were prescribed and he was ordered to come back in several days. On his return and thereafter for about two weeks the condition appeared the same. At the end of this time, however, there was a decided change for the worse. There was now an involvement of the right tonsil similar to that of the left tonsil. The gums were spongy, and bled quite freely. The tongue was coated but its edges and tip were quite red. There was no glandular swelling under either angle of the jaw. The Wassermann test was taken but proved negative for lues. Smears from the mouth and throat showed no evidence of Vincent's angina. The situation was quite puzzling.

We decided to put the oral cavity in the best possible hygienic condition and at the same time to build up the patient's health and strength. Meanwhile he became progressively worse. The redness and swelling of all the tissues of the mouth increased. The pharynx, the gums, and to some extent the tongue, presented grayish patches of erosion surrounded by red areola. The appearance of the gums suggested the possibility of stomatitis of the aphous or scurvy type, but the mode of onset and the history of the case precluded this. Five weeks after our first observation we had not arrived at a diagnosis. The extreme redness of the mouth and pharynx gave one the impression of a toxemia of some sort, even though

there was very little temperature. Another smear for Vincent's disease and another Wassermann threw no light on the question. It might be said, however, that there was too much redness of the mucous membrane and too much pain to be a typical syphilitic condition; as there was also too little ulceration to be really like a Vincent's angina, but with the above laboratory help and the fact

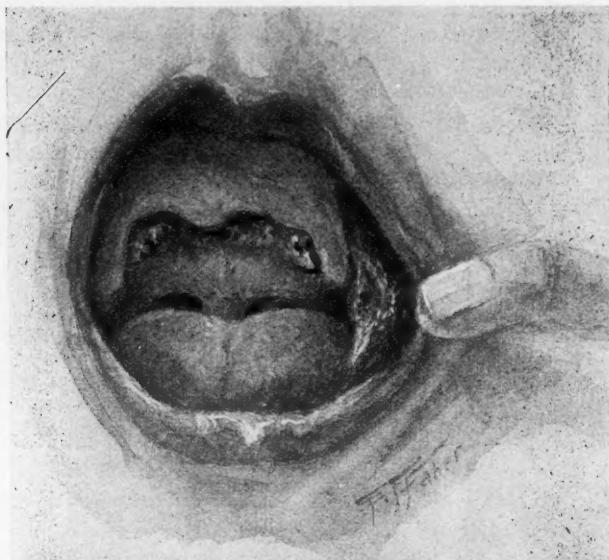


Fig. 2. White, female, age 32 years, Jewess, American-born. Pemphigus limited to mucosa (roof of mouth and eyes). Condition roof mouth Oct. 2, 1924. Duration of affection at this time, five years. The large yellow (on left) and the two smaller yellow areas (on right) represent recently ruptured blebs. The rest of the soft palate is a continuous erosion, the result of repeated bleb formation and a final inability of the superficial cells of the mucosa to reform. (This is a private case of Dr. S. S. Greenbaum, in which dermatological manifestations appeared before the mouth condition, put in to show the similarity of lesions to Fig. 1.)

that there was no glandular involvement they were definitely excluded.

At this time when, we had almost given up as hopeless the discovery of the true state of affairs, the patient himself called our attention to a large blister that had appeared on his chest. On examination a bleb was disclosed and a provisional diagnosis of pemphigus vulgaris made. The man was referred to Dr. Greenbaum, of the skin clinic, who confirmed this diagnosis. This imme-

diately was the solution of the difficult question of the pharyngeal and oral condition. It proved that the beginning tonsillar manifestations were but the signs of a general systemic infection.

This case is of especial interest to nose and throat men, particularly because it showed, that without the lesions on the skin being present, the diagnosis could not have been made.

Since the prognosis of this disease is practically hopeless it should serve as a reminder that all rosy predictions in suspicious cases should be carefully guarded against.

It is instructive because in the range of possibilities of throat conditions pemphigus should not be overlooked.

1714 Pine Street.

HEAD INJURY FROM AN AIR RIFLE; OPERATION AND RECOVERY.

DR. JAMES A. MORGAN, Honolulu.

H. C., Portuguese, male, age 6 years; while at play six months ago was shot by a B.B. lead shot discharged from an air rifle. The shot struck the little patient at about the center of the glabella and just below the junction of the superciliary ridges. X-ray at this time showed penetration of the shot into the frontal sinus in mid-line, fracture of the septum of frontal sinus and lodgment of the shot in posterior wall.

There were no untoward symptoms at the time, and the patient was seen every day during the subsequent month.

Six months after the accident the child fell, striking the side of his head on soft soil. The following morning the mother noticed a slight swelling over the frontal sinus region about the scar where the shot had entered the skull. At the same time, he seemed to have a slight coryza with excoriation of the alae nasi. The coryza con-

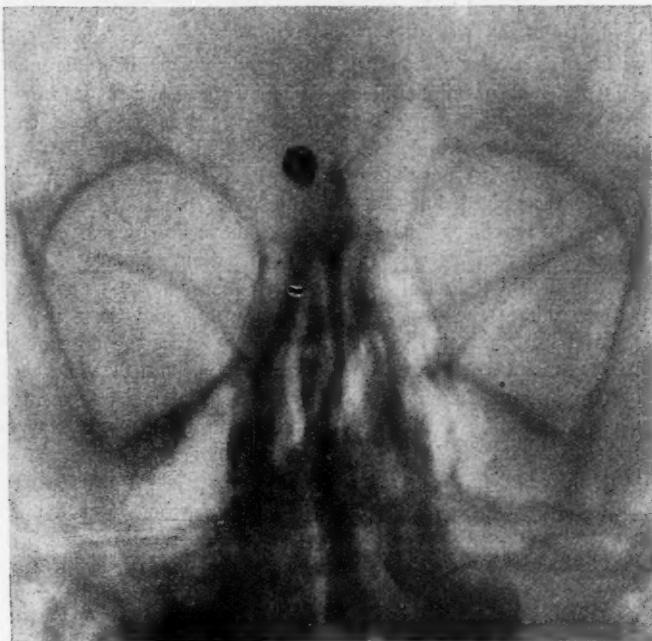
Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 8, 1925.

tinued during the next week and the mother noticed an increase in the swelling in the forehead, disturbance of sleep and the rise of temperature.



At this time an X-ray was taken, which showed clouding of right frontal sinus and an opalescent foreign body imbedded in posterior plate of right frontal sinus.

The frontal sinus was opened through the right eyebrow and found to be filled with pus and beginning polyp formation was noticed. The lead shot was found in the posterior wall of the sinus and resting on the meninges. The shot was removed with considerable difficulty on account of its small size and that it was imbedded



in the bone. The posterior plate was cut away sufficiently to loosen the shot for removal.

There was a postoperative rise of temperature of 1° , which did not persist after the drain was removed from the frontal sinus. Subsequently the little patient made an uneventful recovery.

MAXILLARY SINUSITIS OF ORAL ORIGIN.*

DR. HENRY SAGE DUNNING, New York.

On account of the great developments made during the last few years in oral radiology, and the frequency with which Roentgenograms of the teeth and maxillae are made, maxillary sinusitis of oral origin is found to be a very common disease. For many years, rhinologists have felt that the maxillary sinus was surely their domain, as they have thought in the past that anywhere from 70 to 90 per cent of all maxillary sinus infections were descending infections from the frontals or ethmoids or from the nose itself. I believe that the rhinologists today feel that there are more ascending infections from the mouth involving the antrum than were formerly recognized, but that still the larger percentage of infections of the maxillary sinus come from above downward.

Most of my oral surgery friends feel that the percentage of antral infection of oral and nasal origin is much nearer 50-50. That there are ten teeth in the upper jaw, two bicuspids and three molars, right and left, and also gingival margin to infect the antrum we of course might say that the oral surgeon sees more of these cases originating from the mouth, and that the rhinologist sees more springing from the nasal accessory sinuses. In these days when so many patients are having their teeth radiographed as a matter of routine whether they are in trouble or not, latent antral infections are found, and many teeth are removed whose alveoli enter the antrum on gentle curettage. On the removal of many of these teeth, it is found that there is a chronic low grade infection present in the antrum that has been draining comfortably through the middle meatus for months. This mild infection has taken care of itself very nicely, and the condition has not become acute. We are today giving a great amount of thought to the dental and periodental structures and to the maxillary bones. We are ever on the lookout for bone cysts, neoplasms, impacted teeth, necrosis and infected areas, etc. Few teeth today are extracted by the careful practitioner without being radiographed first. The condition of the bone is known and the bone is often curetted and rongeured *even though the antrum is opened*. If the antrum is opened it should be immediately irrigated while there is good anesthesia, for diagnostic purposes. This procedure tells the operator at once the condition

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 24, 1925.

*Read before the Joint Session of the Section of Otology and the Section of Laryngology and Rhinology of the New York Academy of Medicine, Apr. 22, 1925.

of the antrum and often saves the patient a subsequent antral washing to learn whether or not the sinus is infected.

I have had many cases during the last year in the hospitals and in private practice in which I have had to make a wound in the maxillae that has caused the mouth to communicate freely with the antrum. In many cases, the antrum has been found to be infected, although there were no symptoms before operation. When the operator has by force of circumstances made a good sized oral opening into the antrum and has found the antrum diseased, there are two main factors in the subsequent treatment which should appeal to him. These are: 1, cure of the antral disease as soon as possible, and 2, closure of the communication between the mouth and antrum at an early date.

If we study the physiologic function of the maxillary sinus, and also its anatomy, we find that the antrum was intended to communicate normally with a comparatively clean cavity, the nose; that the nose and the antrum are lined with the same membrane, and that about the same bacteria are found in these two cavities, the nasal and the maxillary sinus. It is evident to the casual observer that nature never intended the mouth and the antrum to communicate, and never intended the mixing of their different bacteria and secretions. It has been proved clinically that a permanent opening from the mouth into the antrum may produce an ascending infection into the maxillary sinus, later causing a pansinusitis; yet how often do we see the antrum, in these chronic infections of oral origin, irrigated for weeks through the opening in the mouth and packed with gauze? Why should a large oral opening into the antrum be permitted to exist? The mechanics of this treatment is wrong. It is analogous to the housemaid sending her sweepings from the cellar through the parlor with its dainty hangings rather than sending the dust from the parlor, a comparatively clean room, through the cellar, generally not too clean, to the back yard. A gauze drain inserted into the antrum from the mouth often draws up secretions from the mouth by capillary attraction as does a wick in a lamp, and frequently reinfects the cavity one is trying to cleanse. Up to a few years ago text-books were advocating the extraction of a tooth through which to treat a maxillary sinus infection. These books did not stipulate the removal of a diseased tooth that was causing the antral infection, but often a healthy one for drainage purposes only. The sacrifice of a healthy tooth in the old days meant nothing and the establishment of the communication between two cavities containing different secretions and bacteria met with the approval of most sur-

geons. This method, known as Cowper's, is not advocated now by many authors, although it is often mentioned. The etiology of maxillary infections in the past has not been carefully considered. Not a month ago a case came to me of maxillary sinusitis for which someone had just performed a radical antral operation. I was told that there was "a sort of 'gum boil' over the second bicuspid", and was asked to treat it. My radiographs, dental films, disclosed a decided shadow extending to the antral floor over the second bicuspid, which was a non-vital tooth. Under procain I removed the tooth, and the curette entered the maxillary sinus very readily. On exploring the so-called "gum boil" above the tooth, I found it led to necrotic bone. Most of the alveolus of the offending tooth was removed and an area of dead bone as large as a penny was removed from the anterior wall of the antrum just above the alveolar process after a flap of the soft tissues had been turned back. I do not believe that this case was properly diagnosed in the beginning before the first operation. There was some diseased membrane over the end of the infected bicuspid, and I am quite sure that the antral infection would not have cleared up in many months, if ever, without some surgical treatment having been given to the infection of the alveolar process.

This type of infection should be diagnosed early, before treatment is begun, and this cannot be done accurately without taking oral Roentgenograms in conjunction with the anteroposterior plates showing the sinuses. If the infection is a descending one from the frontal or ethmoid sinuses, the case naturally should be treated by the rhinologist, and in some cases by the oral surgeon, if he is familiar with the above sinuses. If the infection is an ascending affair from the maxillary bones and teeth, it cannot be cured alone by the rhinologist unless he is familiar with the mouth and dental structures. In either of the foregoing cases, the cause of the infection must be removed; and if the case is a chronic one, the antrum should be cleaned by a gentle curettage and sometimes by removing the lining membrane and must be irrigated and drained properly. It also must be given good ventilation. In nearly all of these cases the sinus should be irrigated with warm saline through an opening under the inferior turbinate, and if the infection is of oral origin, the washings drain downward into the mouth. If the case is of oral origin and there is no opening into the mouth, of course the washings naturally return to the nose and are discharged through that cavity. I do not see why the mouth opening in the oral cases should be packed in any case more than a few days, even if the suppuration has not ceased and although the tissues

around the oral opening are not in sufficient healthy condition to bear sutures. In many cases it is advisable to close mechanically the oral opening for a time on account of the suppuration. In these cases the mouth and the maxillary sinus should be separated by a well fitting "saddle plate" that does not press at all on the edges of the wound leading into the antrum. No plug or projection that enters the opening should ever be used. I cannot condemn too severely the use of any appliance that tends to establish a permanent opening between these two cavities. This saddle plate is best made of rubber, and covers over the labial and palatal surfaces of the alveolar process, and is generally held by clasps. Of course this is a temporary affair, and is to be worn only until the suppuration has subsided and the plastic repair of the opening can be accomplished. This plate in a way acts as the valves of the heart, that is in one direction. It allows of drainage from the antrum downward with gravity under the plate into the mouth, but prevents the seepage upward of the oral secretions into the maxillary sinus. These plates, if constructed properly, never block the drainage, and keep the antrum cleaner than any gauze drain can possibly keep it.

In searching the literature, we find little mention of any operative procedure for closing off an opening from the mouth into the maxillary sinus. Little attention has been given to the fact that the mouth and the antrum are two very unlike cavities, that their secretions and their bacteria contents vary greatly, and that they are much better neighbors when they are separated by a barrier of healthy tissues. In cases in which the opening persists between the two cavities, the only permanent method of closing the communication is by means of a plastic operation. A method will be shown by slides later. Infections of the maxillary sinus are often not diagnosed by the dental surgeon and are frequently poorly treated by him. After all that has been written on this subject, it is pitiable to pick up a modern dental journal and to read in a recent number an article advocating the use of the rubber plug, and further to read that "the plug in the antral opening helps to hold the plate in place".

I believe that the rhinologist and the dental surgeon should work more closely together in the treatment of maxillary sinusitis. I feel that it would be better in most cases for the dentist when he discovers an infection of the maxillary sinus to turn the case over to the rhinologist unless he is especially equipped to handle these cases. I have seen many cases treated by my dental friends through the mouth when the infection was a descending affair from the

nose, ethmoid and frontal sinuses. In many of these cases they accomplished nothing for the seat of the infection was far removed from their field of activity. *On the other hand I do think that the rhinologist* should know in every case of antral infection the conditions of the teeth and the oral tissues. In many cases he fails to recognize the oral pathology until after the case has not responded to his treatment. In some cases after weeks of almost daily irrigations, etc.

Dental radiographs should be taken in all cases and the question of any non-vital teeth that may communicate with the antrum settled before a diagnosis is made. If a tooth looks suspicious in a dental film its vitality should be ascertained by the usual thermal test, ethyl chlorid spray, electric current or some other means. If the tooth is found to be non-vital, even though it has never been filled, it takes considerable courage on the part of the operator at times to convince the patient that it should be removed. In these cases I nearly always obtain the consent quite readily to make an exploratory incision over the roots of the tooth in question, telling the patient that I will not extract it unless it is found to be infected and that it is draining into the floor of the antrum. This generally appeals to the patient as being fair and in this manner I often save for them very valuable teeth that are innocent, even though the dental X-rays may lead one to think differently. Sometimes the radiograph does not show any infection at the root of a tooth for the reason that the tooth has recently become non-vital and there has not been time for a granuloma to form or any bony changes to take place that would show in the film. At other times the X-ray shows shadows cast by double septa on the antral floor. These teeth are nevertheless the cause and must be removed. My method in these cases after finding such a tooth to be infected is to remove it at once and then to irrigate the antrum through the exploratory incision. If the return flow shows pus I then immediately enlarge my incision, extending it anteriorly to the canine fossa and posteriorly to the last molar. I then lay back the entire labial fold of soft tissues and expose thoroughly the anterior of the antrum. By means of chisels, curettes and the rongeur a large opening is made into the antrum, through which a careful inspection of the antrum can be made. Incidentally the end of the tooth socket can be seen and carefully curetted. If there are polypoids present they are gently removed and also any necrotic lining membrane removed. Great care is taken to remove all diseased tissue without injuring unduly any of the healthy lining membrane. The cavity is then carefully wiped out two or three times with a piece

of gauze and then irrigated. The nose has been cocainized previously after the antrum was found to be infected and then a fair-sized opening is made under the inferior turbinate by means of a punch and a curette. A large piece of iodoform gauze is then inserted through this opening and is pulled into the antrum by a tenaculum inserted through the oral opening in the antrum. Pulling a fair-sized piece of gauze about one-half inch wide, doubled generally, into the antrum toward the oral opening already made draws the torn edges of the nasal mucous membrane into the antrum or at least invaginates it sufficiently to cover in most cases the rough edges of the nasal opening. This of course has two advantages. It covers the bony margins of the opening, thus causing almost primary healing over the edges of the bony wound in the lateral wall of the nose and this also prevents the opening from closing as the bony edges are now covered over by mucous membrane and granulation of this wound is prevented. Enough gauze is pulled into the antrum to fill the cavity comfortable but none of the gauze is allowed to enter the mouth wound. This generally prevents subsequent hemorrhage and I think stimulates granulations in the antrum. The oral opening is then closed carefully by a plastic operation of some kind, including the tooth socket. If the antral infection has been very severe a second piece of thin gauze may be inserted between the flaps to give better drainage. This piece is removed the next day. The nasal piece is allowed to remain for forty-eight hours and then is gradually removed by degrees, sometimes not entirely for four days. Then after all gauze has been removed the antrum is irrigated daily with warm normal salt solution and all sutures removed in about three to five days. This operation, I think, can best be performed under local anesthesia, nerve blocking and by swabbing thoroughly the inside of the antrum with cocaine, about 5 to 10 per cent, care being taken of course not to use too much. The patient is also given morphin as a rule before operation. I do most of these operations in the office and if necessary have a nurse go home with the patient and remain with them the first night. Most of these cases clean up in about ten days to two weeks, even though they have been very chronic.

This operation has three distinct advantages, I believe: First, the oral pathology is removed; second, maxillary sinus pathology is obliterated; third, good nasal drainage is established.

The above three objectives are gained by one operation at one time and it eliminates separate operative procedures to correct the nasal and oral conditions.

33 East Sixty-eighth Street.

INTERMITTENT PROTRUSION OF THE RIGHT EYE.*

DR. SAUL J. SELKIN, New York.

W. S., a young man age 23 years, with a negative family history, about November, 1924, began to be troubled with an intermittent protrusion of the right eye, simulating an exophthalmos, appearing now and then at frequent intervals and returning to its normal position during the course of the day. The vision in that eye was also affected. Examination of the eyes showed the vision of the right eye to be 20/100, while that of the unaffected eye was normal. In January, about six weeks after the beginning of the eye disturbance, an anterior and posterior operation on the right side was performed by a surgeon. Two or three days later the vision began to improve and in a short time was normal—20/20—but the intermitted exophthalmos continued, and in February the same surgeon performed a semiradical operation through the intranasal route on the antrum of the same side with the idea of relieving the exophthalmos, again without success.

When the patient came under my observation in March, 1925, he presented a marked exophthalmos of the right eye, with a slight puffiness and redness of the upper and lower eyelids. The left eye was normal. On subsequent examinations the right eye would be back in its socket, with very variation from the left eye. There was no tenderness in the frontal region, the Ewing sign being absent on both sides, and there was no history of headache. The mucous membrane of the nose was normal, excepting where the ethmoidectomy was performed.

Entrance into the antrum was easily accomplished with a probe. There was no discharge of purulent or mucopurulent secretion.

The patient was referred to Dr. Schoenberg, for an ophthalmological examination, who reported a moderate exophthalmos of the right eye with mild engorgement of the blood vessels and a very slight edema of the optic disc. Nothing else abnormal. He felt that the bulging of the right eye and the mild edema were not due to any nasal condition and was inclined to believe that there was some orbital process present—perhaps a periostitis with slight exudate or swelling of the orbital fat—whether this was secondary to some hypophyseal process he was unable to say.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication July 3, 1925.

*Read before the Section on Laryngology and Rhinology, New York Academy of Medicine, May 27, 1925.

A thorough physical examination brought out the further facts that in addition to the history of swelling of the eye for six months there was also a history of increased urination during the same period, chronic constipation, and excessive cigarette smoking. Enlarged lymph glands were found in the left axilla, very active knee jerks, and an acromegaloïd facial contour.

Fluoroscopic examination of the heart and lungs proved negative.

Laboratory findings: Basil metabolism 0.

The urine showed a heavy trace of albumin on two examinations, with many red blood cells; specific gravity, 1027; acid reactions; no sugar.

The blood count showed 6000 white blood cells; a smear revealed no abnormality. Two Wassermann tests were negative.

The blood urea is .065 per cent. This, according to the pathologist, may indicate considerable kidney damage. In association with albumin and red cells, it indicates a subacute nephritis. This, of course, does not rule out the possibility of a neoplasm at the base of the brain. He was put on calcium therapy and other medicament to improve his kidney condition, but with no apparent result as to his eye disturbance.

X-ray examination by Dr. H. A. Goalwin revealed the fact that some cells remained uneradicated at the lamina paparacia, and that there was some cloudiness of the maxillary antrum, with cloudiness of the orbit, haziness of the outline of the right lesser wing of the sphenoid, and depression of the right anterior clinoid process which, together with an apparent breach of continuity of the roof of the right orbit, leads to a suspicion of a right supraorbital tumor.

Details: The skull is rather large, normal in shape, with smooth inner surfaces and several areas of unusual thinness. The thinned areas are particularly striking in the frontal region immediately above the frontal sinuses and at the posterior angles of the two parietal bones. There is evidence of long-standing high-intracranial pressure and overdevelopment of all the pneumatic spaces, a characteristic of pituitary disturbance. The sella turcica is moderately enlarged, but normal in shape and structure of its walls.

There is considerable cloudiness of the right maxillary sinus with thickening of its walls; the right ethmoid cells are also cloudy and their walls are thickened and atrophic; these two sinuses are apparently in free communication with each other.

The right lesser wing of the sphenoid is hazy in outline. The entire right orbital area is cloudy. The right anterior clinoid process is pneumatized and depressed below the level of the cor-

responding clinoid process on the left side. About 1.5 c.m. anterior to the apex of the right orbit there is apparently a breach of continuity of the roof.

The vertical diameter of the right optic canal is smaller than the corresponding diameter of the left optic canal. They are otherwise normal in shape, size and structure of their cells.

Calculated diameters of the optic canals: Right, 4.3 x 4.7 m.m.; left, 3.9 x 6.1 m.m.

A neurological examination was made by Dr. Louis S. Aronson, who reported no evidence of involvement of the brain or central nervous system. "The cranial nerves are all negative. There is evidently a local process behind this eye."

In view of the rather contradictory opinions rendered by some of the examiners, as offset by the detailed X-ray report, the plan of procedure which seems to offer most hope of relieving the condition seems to be to re-operate the ethmoid region and clean out as far as possible all the remaining cells around the orbital region, as revealed by the X-ray. This will be done as soon as practicable, and I hope to report a successful result at a later date.

114 East 61st Street.

A REPORT OF THREE CASES OF PRIMARY ACUTE MASTOIDITIS.* **

DR. SAMUEL J. KOPETZKY, DR. RALPH ALMOUR, New York City.

Case 1: A widow, age 65 years, was first observed by us on Feb. 16, 1924. At that time she had an acute tonsillar infection, which subsided under local treatment. She then complained of a stuffy feeling in her right ear. Otoscopic examination at the time showed both drums to be normal. This sensation in her ear lasted for one week and then stopped entirely. The patient was perfectly well for several weeks.

On Mar. 20, a slight swelling appeared behind the right ear. This was not tender and produced no discomfort beyond the sensation of a fullness of the tissues over the mastoid process. Urinalysis and blood chemistry at the time revealed normal findings. Wassermann

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 24, 1925.

*From the Oto-Laryngological Department of Beth Israel Hospital, New York City.

**Read before the Section on Otolaryngology, New York Academy of Medicine, May 8, 1925.

reaction was negative. The blood count was within normal limits in both total and differential estimations.

The swelling behind the right ear became progressively larger without producing either systemic or local effects. The right drum was at all examinations normal as regards position, color and landmarks. Careful inquiry elicited no history of any aural disease prior to the present condition.

Functional examination of the hearing on Mar. 27 showed but a slight diminution for air conduction in the right ear. There was lateralization of sound to the right ear. There were no symptoms, either systemic or local, which would make one suspect the presence of a focus of suppuration in the temporal bone. The case was treated for one week by the applications of wet dressings externally.

On Mar. 27, there appeared a distinct area of fluctuation over the swelling. The patient was then sent to the hospital for observation. A radiograph taken at this time showed a clouding of the mastoid processes of equal intensity on both sides. No cellular structure was made out on either side.

On Mar. 29, the patient was operated upon. The findings were as follows: Over the right mastoid area there was a swelling, distinctly localized, which fluctuated on pressure. This mass pushed the auricle forward. On incising through the soft tissues, fluid pus escaped under pressure. This seemed to have burrowed forward toward the posterior meatal wall. On retracting the periosteum, a perforation of the cortex was found situated a little below and posterior to the suprameatal spine. The bone surrounding this perforation was very soft and from it a fistulous tract led directly inward toward the antrum. Another purulent tract was found leading to the dura and a third backward toward the sigmoid sinus. The bone and cells surrounding these tracts were cheesy and necrotic. There was very little bleeding from the entire mastoid wound. Scattered throughout the mastoid process were areas of normal cells and normal bone which, when removed, disclosed diseased cells. The dura toward which the fistulous tract led was uncovered for one-quarter inch in diameter and found studded with granulations. A paracentesis of the drum was then performed, but no pus was obtained. The middle ear was inspected through the external auditory canal and found to be normal. The wound was dressed and closed. The patient recovered.

Case 2: A man, age 58 years, began to complain of pain and diminished hearing in the left ear on Dec. 1, 1924. He had always had obstructed nasal respiration, and being advised that this was the

cause of his ear condition, was accordingly operated upon by a rhinologist for nasal polypi. Following this operation, performed Jan. 27, 1925, the pain in the left ear increased in intensity. At this time the drums appeared normal as regards position, color and landmarks. There was, otoscopically, no indication that the left ear had ever before been the site of a suppurative process, and on questioning the patient, no history of previous aural disease was obtained.

One week after the nasal operation a swelling appeared behind the left ear. This, at first not painful, gradually increased in size and became tender to the touch. Sleep was not disturbed to any extent, nor were there any systemic symptoms such as fever, loss of weight, malaise, pain or facial pallor.

The patient was first seen by us on Feb. 9, at which time there was a definite subperiosteal abscess over the left mastoid area, located more above the auricle than behind it. The patient was operated upon the following day, the preoperative diagnosis being acute primary mastoiditis.

On incising the skin, there was a gush of pus from the soft tissues. After retracting the periosteum, a perforation was found in the zygoma through which pus came away in pulsations. On entering the cortex, the perforation was found to communicate with a large perisinus abscess. The sinus was found exposed by the disease and covered with granulations to the extent of one-half inch. The entire mastoid process was exenterated and the sinus was exposed until normal looking wall appeared. The wound was packed and dressed. The patient recovered.

Case 3: Child, age 8 years, had been troubled with swollen glands of the neck during the winter of 1924-25. She had since the age of 2 years, been subjected to repeated attacks of acute nephritis. About Feb. 3, 1925, the child developed a rash over the entire face and neck, associated with septic temperature from 100 to 104° F. This condition was diagnosed as erisipelas by the patient's physician. The child apparently recovered from this attack in one week.

When seen by us on Feb. 21, 1925, there was a tender swelling of the tissue over the left mastoid process. There had never been any aural discharge at any time during the child's life, and the tympanic membrane was normal in color, position and landmarks. The child complained only of pain behind the ear and in the neck. The child was sent to the hospital, where blood counts, blood culture and radiographs were taken. The Roentgen films showed clouding of the left mastoid process and absorption of the bony

intercellular walls. The right mastoid process was normal. The blood count showed an increased polynuclear percentage and an increase in the total number of white cells. The blood culture was sterile and remained sterile for 72 hours.

The condition was diagnosed as primary mastoiditis and the child was accordingly submitted to operation. On incising through the soft tissues over the mastoid area, pus escaped from the lower angle of the wound coming from behind and below the mastoid tip. On retracting the periosteum, a large perforation was found at the lower angle of the old occipito-mastoid suture just a little above and behind the tip. A probe inserted through this revealed a large cavity in the mastoid process. Directly internal to the perforation, and connecting with it by a fistulous tract was an area of exposed sinus, $\frac{3}{8}$ inch in diameter, which was covered with granulations and denoted the site of a large perisinus abscess. The entire mastoid process was next exenterated. The dura of the middle cranial fossa was exposed and found normal. The sinus was then exposed backward and found collapsed and white. There were no pulsations of the sinus, and as far as could be determined without opening the sinus, no blood was coming from above. In view of the good condition of the child, and in the absence of any signs of sepsis or absorption from a purulent focus, no further surgery on the sinus was undertaken. The child progressed favorably for the following six weeks, when it suddenly developed acute glomerular nephritis and died in uremic coma.

COMMENT.

The three cases present the following factors in common:

1. An absence of any aural disease prior to the present.
2. The finding of a normal membrana tympani at all stages of the disease.
3. The failure of the disease to produce even a moderate local or constitutional reaction.
4. The finding of a subperiosteal abscess and a perforated cortex.
5. An erosion of the inner table with an involvement of either the sinus or dura.

Cases such as these have been noted by Phillips, Perkins, Friesner and Beeger. They consider that the infection in passing from the pharynx into the mastoid process skips the middle ear, and by forming excessive granulations in the mastoid antrum, mechanically blocks the mastoid process and isolates it from the tympanic cavity.

51 West 73rd Street.

THE CLINICAL SIGNIFICANCE AND DIAGNOSTIC VALUE OF TUNING FORK TESTS FOR HEARING.*

DR. ARTHUR B. DUEL, New York City.

When first invited to speak on the clinical significance and diagnostic value of tuning fork tests for hearing, I was somewhat loath to accept the honor, on the ground that the subject was too elemental to prove entertaining to a body of specialists in otology. On second thought, however, I was tempted to undertake the task, partly because it involved only a logical consideration of what all recognize as the fundamentals of functional testing of hearing, and partly because I was stimulated to contrast the information gained from the employment of a comparatively simple set of tuning forks with that obtained from the most elaborate apparatus.

What do we really try to determine with tuning forks and the Galton whistle?

1. If the lower tone limit is *raised* above the normal (16 v.s. per second).
2. If the upper tone limit is *lowered* below the normal (30,000 to 20,000). This test is made with the Galton whistle.
3. If bone (tissue) conduction is better than air conduction, or vice versa, the so-called Rinné test.
4. If the tone from a vibrating fork with the shank pressed on the vertex, forehead, or chin, is referred to the poorer-hearing ear or to the better-hearing ear, the so-called Weber test.
5. If the tone of a 128 v.s. or 256 v.s. tuning fork, held in any of these positions, appears to be amplified by crowding the finger tightly into the external auditory meatus, the so-called Gellé test.
6. If the patient hears a vibrating fork for a longer or shorter period than the examiner: *a*, by bone conduction, the so-called Swabach test; *b*, by air conduction.

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 24, 1925.

*Read before the Joint Session of the Section of Otology and the Section of Laryngology and Rhinology of the New York Academy of Medicine, Apr. 22, 1925.

Certain errors have to be guarded against, *e. g.*, in determining the limits by *air conduction*: the position in which the fork is held; the intensity of the vibration quite as much as the tone pitch; the production of overtones, etc. In determining the limits by *bone conduction*: the amount of pressure; the intensity as well as the pitch. It would be futile to contend that absolutely accurate tests can be made with forks. The results are more qualitative than quantitative.

However, quick and practical tests of bone conduction; comparative tests of the right and left ears, or comparative tests of the patient's and the examiner's ears; the Weber, Rinné, Gellé, Swabach tests—all of great value in gaining a concept of the condition of hearing—are made with the 128 and 256 tuning forks. For my own part, these tests are made more satisfactorily by this method than by the more elaborate apparatus.

After the upper and lower tone limits, and the comparative results from air and bone conduction have been determined, the examiner wishes to know at what distances and at what intensities whispers, spoken words, noises (acoumeter or watch), are heard before and after inflation. Comparisons of *tone limits* after inflation are interesting but, while they may not be said to be without value, are not really of much practical importance. What the *patient* really wants is to hear speech, familiar sounds, music, etc., and his estimate of improvement or decadence will be formed by these tests.

As to the clinical significance of these tests; what have we learned by these reactions?

We all know that any lesion obstructing the conducting apparatus in either the external or the middle ear, any interference with the patency of the Eustachian tube, any alteration of the density of the labyrinthine capsule, will cause an *impairment of hearing* varying with the amount of obstruction. The loss of hearing will be in the *lower register*. This will usually be accompanied by tinnitus of a comparatively *low pitch* and probably of a *pulsating character*.

We also know that *all such lesions* of the conducting apparatus, if uncomplicated, will cause a *raising of the lower tone limit, the upper tone limit remaining normal*; the *bone conduction* will be *better than the air conduction*; the tuning fork in vibration placed on the vertex, forehead, or point of the chin, will be referred to the poorer-hearing ear; the Swabach test will be positive. The pitch to which the lower tone is raised will correspond with the

amount of obstruction or interference with the conducting mechanism from whatever cause.

We, therefore, have in tuning forks and the Galton whistle a measure which is most valuable for both the diagnosis and the prognosis of all the so-called catarrhal forms of deafness, the sequelae of suppurative lesions, and otosclerosis.

We are also well aware that lesions of the *receiving apparatus*, uncomplicated with lesions of the conducting apparatus, cause an impairment of hearing depending on the amount of degeneration of the nerve. The loss of hearing will be in the upper register. This will usually be accompanied by a tinnitus of *high pitch* and continuous character. Such lesions will be characterized by a lowering of the upper tone limit, the lower tone limit remaining normal; air conduction will be better than bone conduction; the tuning fork in vibration placed on the vertex, forehead, or point of chin will be referred to the better-hearing ear; the Swabach test will be *negative*.

So we have in uncomplicated lesions of the *conducting apparatus* an absolute reversal of the tuning fork tests which we find in uncomplicated lesions of the *receiving apparatus*.

We also know that obstruction of the *conducting apparatus* does not lower the upper tone limit unless there is a fixation of the stapes in the oval window. With a fixation of the stapes in the oval window, there will be a marked interference with the *upper tones* as well as with the *lower tones*.

In a given case, then, where there is marked interference with both upper and lower tone levels, it is quite obvious that *only* by a carefully interpreted comparison of bone and air conduction, as furnished by the Weber, Rinné, Gellé and Swabach tests can we arrive at a differential diagnosis, let us say, of an otosclerosis with fixation of the stapes, and an otosclerosis with a concomitant degeneration of the eighth nerve. In each the hearing distance for both whisper and acoumeter might be the same. In the first case, Weber would be to the poorer-hearing ear. Rinné would be negative; Gellé would be negative; Swabach would be positive. In the second case, each of these tests would be reversed: Weber would be to the better-hearing ear; Rinné would be positive; Gellé would be positive; Swabach would be negative. I know of no way, other than by tuning forks, or making such an accurate differentiation.

And there you are! "It's as clear as mud." It's much like the little boy's conundrum in which he asked: "What is it that has

two legs, is all over feathers, lays an egg every day, and *barks like a dog?*" His enthusiastic audience, anxious to guess that it was their staunch friend who furnished the piece de resistance of their daily breakfast, were pondering over the last dubious factor in the problem, when he triumphantly announced that *it was a hen!* "Oh," said they, "but how do you get the 'barks like a dog'?" "Well," said he, "it seemed so easy that I just put that in to make it difficult." And so, amongst our easy problems, "just to make it difficult", we may "throw in" a case of otosclerosis with Eustachian stenosis from catarrhal processes, on the one hand; and an otosclerosis with a concomitant eighth nerve degeneration, on the other; then a case of a child with obvious tonsils and adenoids, apparently causing a catarrhal deafness, but whose profound loss of hearing actually has resulted from an attack of mumps; and, lastly, an eighth nerve neuritis from toxic poisoning, which will raise enough havoc with the functional test to upset the easy interpretation of all our fundamentals. So, any of these, and many others which I might recount *ad nauseam* if not *ad infinitum*, might make us think our staid old hen "was barking like a dog".

Nevertheless, our tuning forks and the interpretation of the results of these fundamental tests which I have outlined would be our mainstay in helping us to form our conclusions. And this is about all. In the main, this discourse has been so elemental that I cannot do better, in closing, than to quote a familiar passage from "Mother Goose":

"Three men went out to sea in a bowl.
If the bowl had been stronger,
My tale had been longer."

4 East Sixty-fifth Street.

BRAIN ABSCESS, SINUS THROMBOSIS AND MENINGITIS COMPLICATING ACUTE MASTOIDITIS;
A CLINICAL STUDY OF TWO CASES.

DR. J. M. POLISAR, Brooklyn.

Chairman and Gentlemen: The following case which I am presenting is one of sinus thrombosis and temporosphenoidal lobe abscess following acute mastoiditis.

Case 1: History: D. B., female, age 10 years, admitted to the Brownsville and East New York Hospital Jan. 23, 1925, complaining of pain in the left ear and mastoid region accompanied by fever. The story was that following a cold in the head, six months ago, she developed pain in the left ear, followed in two days by a spontaneous discharge, which continued for six months. In the past two weeks the discharge became more profuse and the patient developed pain and a temperature ranging from 101-103°. Two days before admission the temperature rose to 104-105° preceded by chills. A painful swelling was noted over the mastoid. The discharge became scanty, thick and fetid. The R.B.C. was 4,000,000 with an Hb. of 70 per cent. W.B.C. 13,400 with 79 per cent polys. X-ray of the mastoid showed coalescence, especially at the knee of the sinus, with slight haziness of the sinus outline on the affected side. Ear smear showed presence of *staphylococcus aureus*.

Patient was operated on the day of admission. A coalescent mastoid was found with the wall of the sinus exposed for about a half-inch and partially collapsed. The tegmen was intact. Aspiration of the sinus revealed neither blood nor pus. On incision of sinus free bleeding was obtained from above and below only after a well organized clot was dislodged and removed. Because of the gravity of the patient's condition jugular ligation was not attempted. The blood culture taken the following morning was sterile. For the first two days the patient ran a moderate temperature and the general condition was good. On the third and fourth day there were several chills followed by a septic remittent temperature ranging from 99-106°. The blood culture at this time showed a *streptococcus hemolyticus*.

A jugular ligation was then performed, five days after the mastoid operation. The blood culture after the operation was still

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 24, 1925.

*Read before the Section on Otology, New York Academy of Medicine, May 8, 1925.

positive. For the next two days the temperature was very high (up to 106°), then declined to 99° and stayed down for the following four days. After this interval the temperature suddenly rose to 105° and remained at this level for the next four days. The patient's condition at this time was quite serious. She was drowsy and irrational at times, picking constantly at her nose. The only neurological findings were a slight Babinski and an ankle clonus on the right side, and a slight blurring of the optic disc on the left side with sluggish pupillary reaction to light. There was no rigidity of the neck, but the spinal fluid came out under increased pressure, was clear and contained 14 cells per m.m., principally polys. The culture of the spinal fluid was negative. The blood culture at this time and for the following seventeen days (up to time of exitus) was persistently negative.

At the suggestion of Dr. Kopetzky a blood transfusion was performed and 250 c.c. of blood by a matched donor was given. On the next day the patient was extremely restless and irrational, the left eye was closed, the upper lid was edematous and tender, the pupils were dilated, and there were focal signs of a left-sided intracranial lesion, namely, total aphasia, right hemiparesis beginning with the face and later affecting the upper and lower extremities, and an ankle clonus and Babinski, as well as a slight hypoesthesia on the right side.

On Feb. 7, nine days after the jugular ligation, an operation for brain abscess was performed. On removing the tegmen, the dura was intact and presented no pathological changes. A needle was introduced into the brain substance in the region of the temporal lobe for a distance of 3 c.m., and 2 c.c. of thin milky pus was aspirated. The abscess was incised and drained, and patient left the operating table in fairly good condition. For the next five days the temperature stayed down at 99-101° and the patient's general condition was much improved. Because of better co-operation on the part of the patient, the aphasia was more carefully analyzed and was found to be of the sensory type, namely, a word deafness. This, of course, definitely localizes the lesion in the temporal lobe because of the involvement of the Wernicke centre.

On the sixth day post-operative, there occurred a slight chill with a rise in temperature up to 104°, spinal puncture now disclosed an increased cerebrospinal pressure and a drop in the cellular count down to 4 cells per m.m., otherwise remaining the same as before. In twenty-four hours the temperature dropped to 99-100.5° and stayed down for four days, during which time patient's

condition was generally improved. On the eleventh day after the third operation the patient became stuporous, the face was flushed, temperature rose to 103°, the pulse was rapid and small. At 5 p. m. patient developed a tonic convulsive seizure with a turning up of the eyeballs. These repeated themselves frequently and the temperature soon rose to 108.4°. The lumbar puncture showed a slightly turbid fluid, with 57 polys., but the pressure had fallen, spinal fluid culture remaining sterile.

At 9 p. m. of the same day I had the pleasure of assisting Dr. Kopetzky at a decompression and exploratory operation. Only a few drops of pus exuding from the old brain abscess was found. However, the presence of other remaining abscesses is nevertheless not to be excluded.

The patient died at 3 o'clock the next morning.

Unfortunately an autopsy could not be obtained in this case.

Summary: I was prompted to report this case because of the relative rarity of the association of brain abscess and sinus thrombosis, also since there were no perceptible signs of communication between the mastoid cavity and the brain, we presume that the abscess or abscesses must have been metastatic in origin, and, lastly, because of the richness of symptomatology in this case, which makes it sufficiently interesting from a diagnostic standpoint.

The case just presented was that of a left-sided temporosphenoidal lobe abscess. The one to be reported next is a right-sided abscess in the corresponding brain area.

Case 2: A girl, age 9 years, came under observation because of pain in the right ear, swelling over the mastoid, headache and fever. She had had a spontaneous discharge from the affected ear for the past few weeks. While at this time no further details were elicited regarding the previous history, a later report disclosed the fact that headache had been present for months before. Examination showed a thick purulent discharge from the affected ear, sagging of the superior posterior wall and a marked tender swelling over the mastoid. Temperature was 104°, pulse 140, and respiration 26. The smear from the right ear showed a staphylococcus aureus. The W.B.C. was 9,400, with 82 per cent polys, and the R.B.C. was 4,600,000 with Hb. of 90 per cent.

The child was taken to the hospital the same day, namely, Feb. 28, 1925, and a mastoid operation was performed. It was rather striking that within four hours, *i. e.*, from the time I first saw her up to the operation, the swelling over the mastoid had notably decreased in size. At the operation a perforation of the cortex was

found just below the posterior root of the zygoma. After removing the cortex, we found a very small amount of pus, if any, but there was complete cellular destruction and necrosis at the tip, antrum and especially at the zygoma. The sinus plate was extremely superficial and was accidentally uncovered. There was no perceptible exposure of the dura of the middle fossa. The child made an uneventful recovery and at the end of the week left the hospital apparently cured, having only a slight discharge from the right ear and an almost closed healthy granulating wound.

Ten days after the operation the child developed a temperature of 104° preceded by chilly sensation. The next day the child complained of pains over the right eye and right temporal region. On the day following, the pain still persisted. In addition she became very sensitive to light and noises, the temperature, however, dropped to 101°. During the two succeeding days the patient was more comfortable, though the pain over the right eye still persisted. The operative wound was practically healed and the ear was dry.

On the fifteenth day after operation, or on the fifth day of this post-operative complication, the general condition became markedly aggravated—the child getting more irritable, headache worse, vomiting fluids, but not projectile in character. The neurologic examination at this time showed a Babinski, ankle clonus and a slight Kernig on the left side, in other respects negative.

In view of the gravity of the situation, Dr. Kopetzky was consulted. He found the child sitting up in bed and more or less comfortable. There was an ankle clonus and a slight Kernig on the left side. The pupils reacted somewhat sluggishly to light. The head and neck were freely movable and there was no tenderness at any part of the skull. He advised hospitalization, with the object of taking a spinal puncture, examination of eye grounds and further study of the case. The parents as well as the patient were hesitating as to the necessity of hospitalization; but, the following morning when the patient reached the hospital, it had definitely lost ground. The patient lay in a semi-comatose condition and did not respond to questions. There was marked cervical rigidity with beginning ophthathamus. Twitching of the mouth and hands were noted, as well as a slight left facial paralysis. The right pupil was larger than the left and reacted very sluggishly to light. There was also ptosis of the right lid. Both eyeballs were in a stage of moderate diversion, the right disc was moderately blurred, hyperemic and elevated about three diaptus around the surround-

ing fundus. The left eye ground showed moderate hyperemia of the disc with a turgescence of the blood vessels.

The R.B.C. was 4,150,000 with a Hb. of 80 per cent. The W.B.C. 22,000 with 90 per cent polys. The spinal fluid came out under great pressure, turbid and on examination showed to contain 5 rings of albumin, 8,400 cells per m.m., mostly polys. The smear from the spinal fluid showed gram positive diplococcus.

At this time the patient was in a moribund condition and the cisterna magna was drained in a comparatively short time. Further exploration, however, would have meant the death of the patient on the operating table.

The patient died at 3 o'clock the next morning.

Post-mortem of brain as performed by Dr. Gross showed "the dura to be injected, the right temporal lobe immediately adjacent to the tegmen tympani was necrotic and purulent. At the junction of the tegmen with the squama the bone shows a necrotic opening, the size of a pea, communicating with the dura. The brain showed intense congestion of the cortical veins. There is a diffuse opalescent and at times suppurative exudate lying under the pia and the sulci. This is most marked over the left frontal area and not at all seen at the base.

Upon sectioning the brain in the usual way, the ventricles were found clear. The basal ganglia on the right side bulged somewhat into the lateral ventricle. The white matter as a whole showed intense vascular congestion. In the right temporal lobe, limited by the cortex externally, the external capsule internally, and extending from the anterior surface of the temporal lobe to as far back as the occipital lobe, there is a large abscess containing approximately two ounces of pus. The abscess cavity is lined by a thick pyogenic membrane.

Microscopically the section of the wall of the abscess cavity showed necrosis of brain tissue, suppurative inflammation, intense perivascular infiltration with numerous hyalin thrombosed vessels. Areas of neuranocephagia and hemorrhages are scattered throughout.

Summary: In going over the case one will remember that the swelling over the mastoid had subsided before the operation, that no free pus was found in the mastoid cavity, that at post-mortem an abscess which has destroyed almost half of the temporal lobe and lined with a thick pyogenic membrane was found, a condition usually not found in brain abscesses of very recent origin.

We assume then that the brain abscess must have been there for months before, that a direct communication between the mastoid cavity and the dura must have existed prior to the operation, that before operation the pus from the mastoid escaped into the brain substance, thus explaining the reduction of the swelling over the mastoid before operation. The bony defect in the tegmen being very small at the time of operation must have escaped my observation, that while the wound was open the brain abscess was draining through the wound, but as soon as the wound closed, further destruction of brain tissue went on with the results as presented.

Of paramount importance is the fact that thirty-six hours before exitus, with so much destruction of brain tissue present, the patient did not look acutely ill.

With your permission, Mr. Chairman, I'll ask Dr. Gross to kindly demonstrate the pathology of the brain which I have just presented.

391 Pennsylvania Avenue.

TEMPOROSPHENOIDAL ABSCESS AND MASTOIDITIS OF DOUBTFUL ORIGIN.*

DR. WM. SIEGMESTER, Brooklyn, N. Y.

Mrs. B. K., age 31 years, has been admitted to the writer's service at the United Israel Zion Hospital, Sept. 9, 1924, at 6:30 p. m.

Family history: Negative.

Past history: Had lump removed from breast eight years ago, married seven years, one child living and no other pregnancies.

Present history: Eight weeks ago had carbuncle on right side near lumbar region. Has been operated on and condition cleared up in four weeks. One week after the operation the patient complained of severe earache and toothache and could not open mouth. This condition continued for three weeks.

X-ray of teeth revealed two apical abscesses in two middle upper incisors. Three bridges and four teeth were removed. Pain in the ear persisted and she developed severe headache over right parietal region. Her temperature at that time ranged from 99 to

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 24, 1925.

*Read before the Section on Otolaryngology, New York Academy of Medicine, May 8, 1925.

100° and patient began to vomit. At first, typhoid was suspected, widal was negative. The case was diagnosed as influenza of gastro-intestinal type. Condition continued the same up to six days before admission, when the right ear began to discharge pus. An ear specialist was called in and diagnosed the case as O.M.P.A. and did a paracentesis. She has not had any medical care up to admission. Two nights before admission, patient had involuntary motions of her arms, and gripped her head tightly. In the morning patient became drowsy and complained of severe headache. Her physician had her admitted to the hospital.

Status presens: Patient well nourished. In semi-conscious condition, answering questions slowly, with hesitation. Temperature 99° pulse 70.

Neurological examination by Dr. S. Rottenberg. Patient in semi-stuporous condition, but can be awakened. Responds to questions but soon falls asleep again. Points to head over right orbit, where there is a decided swelling extending over zygoma. There was slight ptosis of left lid and a decided weakness of left facial muscles. Tongue deviates to left. Palsy of left external rectus muscle. Weakness of left arms and leg. Abscence of abdominal reflex, left. Presence of Babinski and Oppenheim. Knee jerk is slightly exaggerated left side, ankle clonus absent. No meningeal symptoms.

Diagnosis: Evident lesion of right side of cerebrum. Most likely involving temporosphenoidal lobe.

Ear examination showed profuse purulent discharge from right ear, anterior inferior perforation of drum membrane. Same was bulging. There was a distinct drooping of superior canal wall. Swelling over zygoma in region of temporal muscle, which is markedly tender. Right mastoid tender.

Diagnosis: Acute mastoiditis with either extradural or temporosphenoidal abscess. Advised mastoidectomy with exploration of temporosphenoidal lobe.

Eye examination by Dr. Kruskal. Both discs swollen, outline blurred. Veins full, distended and tortuous. Many large hemorrhages on right disc and adjoining retina. A few small hemorrhages on left fundus.

Diagnosis: Bilateral optic neuritis (more marked on right side).

Blood examination: R.B.C. 4,900,000, Hb. 90 per cent, W.B.C. 19,000, plys. 87 per cent.

Lumbar puncture 30 c.c., clear, pressure increased. Globulin normal, sugar reduced, cells c.cm. 22 polys., 9 monos. 13.

X-ray, right mastoid, hazy and ill defined, showing an infiltrated triangle in region of antrum. In the region of squamous portion of temporal bone, slightly above and in front of external auditory meatus there is a circular lobulated shadow of decreased density about half an inch in diameter.

Patient was operated on by the writer at 9:30 p. m.

Operative findings: Cortex congested.

Mastoid diploic in type, filled with granulations. Few tip cells filled with pus.

Antrum filled with pus and granulations.

Tegmen antri ruptured.

There was a sinus leading anteriorly filled with pus. Incision extended anteriorly for about one-and-a-half inches, cutting temporal muscle, a large accumulation of pus under muscle found. There was a rupture in squamous portion of temporal bone, communicating with a large epidural abscess. Dura was covered with granulations. There was no rupture of same or sinus leading into cerebrum found. Bone removed for one-and-a-half inches, until normal dura was found on all sides. Having found such a large epidural abscess, patient not being in good condition the writer did not deem it advisable to explore the cerebrum and decided to wait developments till next morning, if there be no amelioration of symptoms, to explore the temporosphenoidal lobe. At 1 a. m. patient's condition fair, pulse 104. Respiration 30. At 4 a. m. patient's temperature rose to 107°, pulse 144. Cynotic, oxygen was given. Patient did not rally and died at 8 a. m.

On entering with a needle through the wound in the temporosphenoidal lobe, post-mortem, there was found an abscess which contained 6 c.c. of thin greenish pus.

This case is most atypical. Temporosphenoid lobe abscesses on the right side are usually diagnosed very late. Their course is usually very long, especially the latent stage. They are amenable to surgery, even those that succumb after operation linger for some time, the patient dying either from an encephalitis developing afterwards, sepsis from poor drainage, or when it is multiple, from the rupture of an abscess which has been overlooked by the operator. The etiology after operation is usually very easily established.

This case has fully developed within five weeks. There has been no period of latency, the period of excitation merging with the terminal period. It has been diagnosed when first seen, patient dying ten hours after operation. The etiology, post-operative, cannot be established with certainty.

On analyzing this case several questions come to one's mind. We had here, four abscesses communicating with one another through narrow channels: "mastoid, subtemporal, extradural, temporosphenoidal". Where did the first originate? Did it originate in the mastoid, breaking through the cortex of the squamous portion of the temporal bone, forming also a subtemporal abscess and traveling through the dura, forming the temporosphenoidal abscess? Or was the abscess entirely metastatic, forming originally into the temporosphenoidal lobe from an embolus from the original carbuncle in the thigh, traveling afterwards through the dura, forming the extradural abscess, through the tegmen into the mastoid and through the squama, forming the subtemporal abscess?

At first thought one would consider the former possibility, as most temporosphenoidal lobe abscesses are considered of otitic origin, especially when there was a mastoiditis present.

Secondly, it is rather unusual to have metastasis from a superficial carbuncle into the temporosphenoidal lobe, without involving the lung, kidneys or any other viscera. Yet, analyzing the case as a whole, we must rather favor the second hypothesis. The principal complaint of the patient was headaches and vomiting, four weeks prior to the operation. She did complain of earache, yet the drum membrane has ruptured only six days before admission. We cannot conceive that a mastoiditis giving such severe symptoms, fever, headaches for four weeks, breaking through the tegmen and the tough dura, shall not break through the drum membrane. Temporosphenoidal lobe abscesses occur very rarely in acute mastoiditis.

If it does occur, I have not seen a case reported to develop fully in one week. Secondly, the micro-organisms found on examining discharge from ear, from mastoid wound, from extradural and temporosphenoidal lobe abscess, was found to be pure staphylococcus, which is rather unusual for acute mastoiditis: it is more usual for a carbuncle. From the above the writer rather inclined to believe that the abscess was metastatic in origin, breaking its way outwards.

4915 Fourteenth Avenue.

SOME CLINICAL REMARKS ON MODIFIED RADICAL
MASTOIDECTOMY FOR CHRONIC PURULENT
OTITIS MEDIA AS PRACTICED BY THE
AUTHOR, WITH LANTERN SLIDE
DEMONSTRATION AND PRE-
SENTATION OF PATIENTS
SHOWING RESULTS.*

DR. HUGH B. BLACKWELL, New York City.

Despite the great advances made in otology in recent years and the general dissemination of knowledge concerning surgical technique of the mastoid among the profession and the improvement in hospital facilities for treating and operating upon diseases of the ear throughout the United States, the mortality statistics taken from the Census Bureau from 1911 to 1921, inclusive, show not only a relative but an actual increase in the number of deaths attributed to ear disease. Roughly speaking the figures for 1921, which is the last year available, are almost double those of 1911 and are based upon the reports of thirty-five states. The leading insurance companies are about divided upon the subject of issuing policies to individuals afflicted with chronic otorrhea, a number of them refuse to insure such an applicant on any basis and those who do would only issue a policy at an advance in age of from 30 to 50 per cent. For example, a man, say age 35 years, who has a non-odorous aural discharge of a chronic nature, would have to assume the rate given to a normal man of 42 years; on the other hand, should the discharge be of a foul nature he would have to accept the rate allowed a normal applicant of 47 or 48 years.

Unless we are mistaken it has seemed to us that in recent years there has been a growing indifference on the part of otologists generally to the potential gravity of chronic otorrhea, that is as compared with the attitude of the profession in previous years.

A reference to the above facts is therefore interesting and timely. We also believe that during this period of the past fifteen years there has been a growing reluctance on the part of otologists in recommending the radical operation as the only source of relief in chronic otorrhea, at the same time more marked dependence

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication Mar. 20, 1925.

*Read before the New York Academy of Medicine, Section on Otology, Feb. 13, 1925.

being placed upon intensive treatment of different kinds for this condition; this attitude on the part of the profession might be ascribed to the following reasons: first, the loss of hearing which usually follows the performance of a radical operation; second, the incidence of facial paralysis, which, by the way, more frequently occurs as the result of intratympanic instrumentation; and third, that despite all attempts the aural discharge frequently persists after the operation. Conversely, in a patient presenting a similar clinical aural picture, the feeling on the part of the otologist that

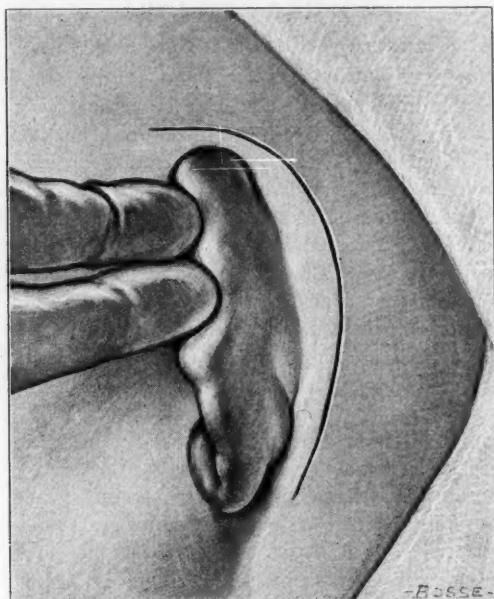


Fig. 1. The primary incision. Its upper extremity is directed horizontally forward.

in the absence of urgent symptoms he is quite justified in treating this patient more or less indefinitely and that as long as the patient can be under observation and observed from time to time and that with the aid of spinal fluid examinations when necessary, X-rays, close attention to clinical manifestations, the patient's position will be reasonably safe, the physician believing that it will be always possible to foretell the development of a dangerous complication by making an early diagnosis and performing the operation before its onset.

In view of the statistics quoted I would like to ask are we justified in maintaining this attitude of non-operative interference in the absence of urgent symptoms in chronic otorrhea and to just what extent can we depend upon our diagnostic aids in forestalling the development of dangerous intracranial complications?

In this connection we must remember the great difficulty we have in keeping such patients under observation and maintaining the necessary clinical contact with them, as of course they are practically all ambulatory cases and their long years of association with this condition has caused the patient to either ignore it or treat it lightly, a great many cases not realizing that a discharge is present.

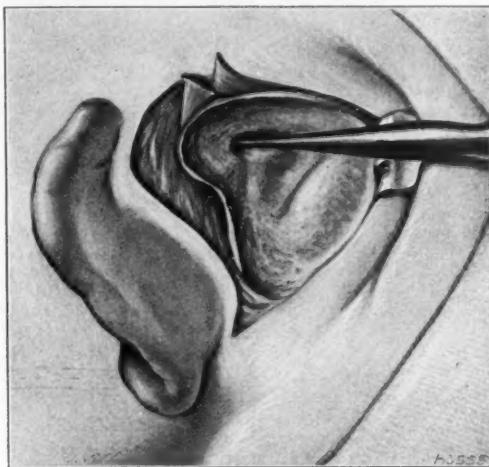


Fig. 2. Curette in position about to remove the external attic wall. The horizontal semicircular canal is visible just below and parallel to the narrow extremity of instrument shank.

Such individuals only think of consulting an aurist when the discharge becomes offensive or earache ensues. Furthermore, the suddenness with which intracranial conditions develop is frequently most disconcerting; one fact is at least certain, that when the characteristic facies of meningitis develops or germs appear in the spinal fluid the patient's doom is sealed; and these manifestations may occur early in the course of the complication. Granted that this is true, what then should be the proper attitude of the otologist in deciding the proper course to pursue in a given case of chronic otorrhea?

Severally speaking, we believe that in the absence of urgent or suggestive symptoms we should apply correct methods of treatment until it is quite evident that it is impossible to affect cure in this manner, the nose and throat should receive proper attention during this period. If after two or three months treatment and the discharge still continues, particularly if the odor still persists, there being no other contradictory reasons, such as age (advanced) or poor general condition, etc., we would advise an operation upon the mastoid. What kind of an operation would we advise? Before entering this question, I would like to discuss some features of the pathology of chronic mastoiditis.

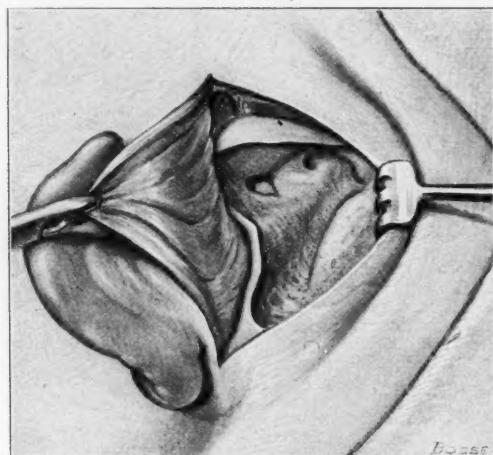


Fig. 3. The external attic wall partially removed, revealing the body and short process of the incus lying in the "fossa incudis" just below and anterior to the prominence cap of the horizontal hemicircular canal.

To those otologists who have performed a sufficient number of radical operations the faulty practice of defining as otitis media purulenta chronica cases of chronic otorrhea which have resisted treatment is quite apparent. The condition should be termed chronic mastoiditis, and deserves to be considered as such and not as the name implies merely a chronic purulent discharge in the middle ear. I feel sure that if the average individual who has a chronic otorrhea knew that he was suffering with chronic mastoiditis many more of them would be willing to submit to an operation upon the mastoid for its relief. The site of the trouble and source of the

discharge lies not in the middle ear but in the mastoid itself, as we well know there forms in these cases a cavity of varying size in the region of the antrum, which becomes filled with granulations, cholesteatoma, pus, detritis, dead bone, etc. During the course of the disease the overlying bone and surrounding walls of this cavity become rarified and condensed, the accumulated products of inflammation forming a nidus of infection which constantly reinfects the middle ear, causing a continuance of the discharge. Pus here may form under pressure, which may be so gradually applied as to give little evidence of pain and erosion may suddenly

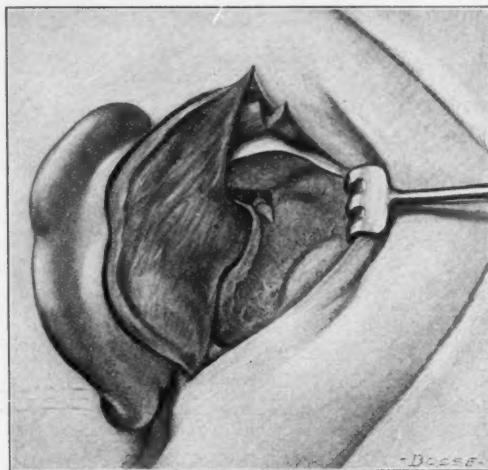


Fig. 4. The external attic wall has been removed, the head of the malleus with its superior ligament can be seen anterior and internal to the incus. The internal and external attic spaces lie respectively on the inner and outer sides of the malleo-incudal body.

take place in the contiguous dura of the middle fossa, knee of the sinus or cap of the horizontal semicircular canal. It is in these localities specified which are most often found to be first affected and resulting in intracranial complication during the course of chronic otorrhea, caused no doubt by their proximate relation to this cesspool of infection always found in the antrum region in chronic mastoiditis. The size of the space depends upon the relations of these important structures to each other, *e. g.*, overlying dura, knee of the sinus and floor of the antrum, which is formed in part by the cap of the external semicircular canal.

It is evident, therefore, that the only way to surgically insure a patient suffering from chronic mastoiditis from serious intracranial complications is to thoroughly aerate, drain and expose the antrum region as otherwise this infected focus will remain or reassert itself. Nature sometimes has a way of automatically curing chronic mastoiditis by causing a necrosis of the posterior bony canal wall down to and including the epitympanic ring, which when sufficient bone sloughs away permits permanent drainage from the

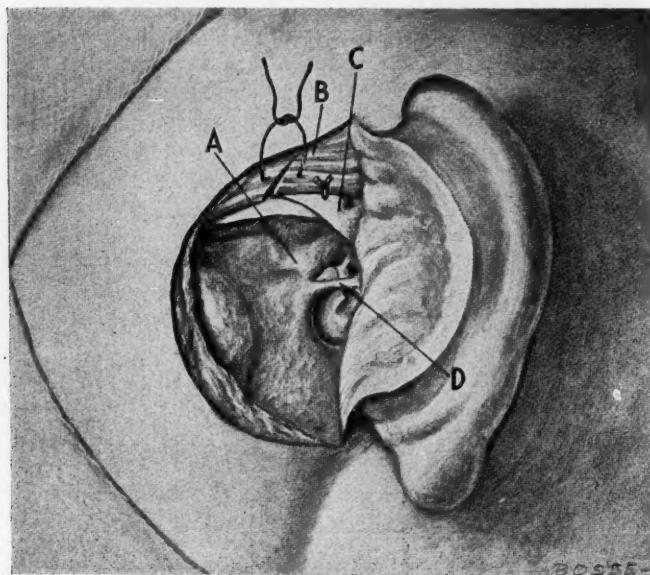


Fig. 5. Opposite mastoid. Operation more advanced, posterior bony canal wall has been lowered, leaving epitympanic ring, drum and ossicles intact. A—External semicircular canal. B—Temporal muscle. C—plastic meat flap sutured to fascia of temporal muscle. D—Epitympanic ring of bone showing the alveo-incudal body lying just above and internal to the ring and the drum below.

interior of the mastoid and often approximates the result obtained by the operation about to be described. It might be said with a certain amount of truth that this operation is an extended effort on the part of Nature to cure the condition.

Realizing, therefore, that the labyrinth is most frequently found to be eroded at the cap of the horizontal semicircular canal, that the bone covering the sinus at the knee or its proximate relation

to the antrum most frequently diseased, also that the adjacent dura overlying the antrum to be that which is most frequently exposed and diseased by mastoid inflammation, it is evident that any operation having for its relief the cure of the patient and his subsequent safety against the development of serious intracranial complications must permanently drain, aerate and expose the antrum region. The futility of curing chronic mastoiditis by curetting the Eustachian tube is quite apparent. The radical operation satisfies the neces-

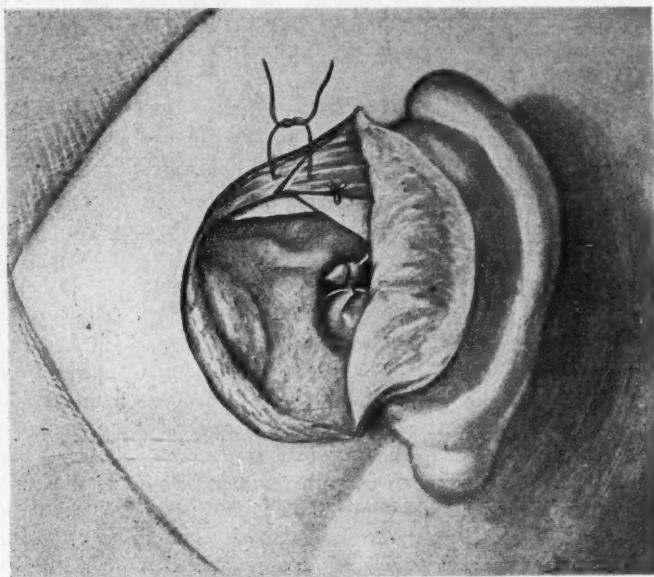


Fig. 6. View of operation completed, the epitympanic ring has been removed in the superior portion, the drum and ossicles have not been disturbed and are allowed to remain in situ. Posterior wound is now sutured. Cavity is subsequently dressed per new meatal canal.

sary postulates as stated, but of course has the concomitant drawbacks of subsequent loss of hearing; danger of facial palsy and sometimes continuance of the discharge. It is our belief that the practice of curetting the Eustachian tube during a radical operation frequently instead of obliterating that structure leads to a continuance of the discharge by reason of the mucous membrane persistently growing from the enlarged tympanic orifice, very much as it will sometimes grow from the mastoid antrum after a simple

mastoidectomy has been performed and the antrum thoroughly widened and exposed; subsequently should the antrum be tightly packed there would probably result a more or less permanent postaural sinus and depressed scar. When once the antrum region has been permanently aerated and drained the middle ear returns to normal in so far as it is possible for it to do so without any curetting of the tube whatsoever. Marginal perforations involving a great deal of the surface of the drum will frequently heal. There seems to be a primitive natural effort on the part of the tympanic membrane to reconstruct itself when once the cause of this destruction has been removed, which is analogous to the restoration of synovial membrane in cases of joint excision. This tendency is strikingly observed following a radical operation where every vestige of drum has been removed; after the wound is healed tissue closely resembling tympanic membrane will frequently be found stretching across the bottom of the radical cavity.

Some fourteen years ago, realizing the deficiencies of the radical operation as an operative cure-all for chronic mastoiditis, the author performed his first modified radical operation for the purpose of conserving and improving the hearing, causing a cessation of the discharge and, if possible, insuring the patient against future development of serious intracranial complications.

Operative indications: This operation seems to be especially indicated in cases of O.M.P.C. with a history of discharge ranging from several months to several years. Usually with a discharge of about five years or more such extensive necrotic changes have taken place in the middle ear, with resultant loss of hearing as to render the modified radical operation useless, although this is not always the case. From a functional standpoint, however, the operation is indicated in any case of chronic mastoiditis with very good hearing, which continues to discharge despite conscientious and persistent treatment as it is reasonable to suppose that a continuation of the discharge will cause a diminution of hearing in the affected ear. Cases which present a wide antrum are more favorable subjects for the operation. It should be the operation of choice in cases of exostosis of the canal associated with O.M.P.C., and in perforation of the pre-mastoid lamina with necrosis of the posterior bony canal wall.

Operation: The usual postaural incision is made as in the Stacke operation. The soft parts anterior to this incision are elevated and retracted forward: the cortex is removed with a gouge and the subcortical cells with curettes until the antrum is opened; the pos-

terior canal wall is lowered and the antrum widened to its fullest possible extent. When the short process of the incus becomes visible, the external attic wall is removed by placing the back of the curette external to and in front of the incus and curetting from within outward. The bony canal wall is still further lowered until the facial ridge is reached, leaving only the epitympanic ring in its superior portion with a width of about a sixteenth-of-an-inch arching above the top of the drum from the posterior to the anterior canal wall. In our early cases we allowed this ring to remain, but in recent years we have removed it in nearly all instances, carefully separating it from the edge of the drum. By so doing we secure better drainage and more subsequent aeration and space in the antrum region and it is not associated apparently with any loss of hearing. The granulations, polypi and cholesteatoma lying in the external and internal attic are removed by curetting internal and external to the malleo-incudal body, care being observed not to destroy the suspensory ligament of the malleus. In curetting near the incus, great care must be taken not to disturb the ligament which binds the extremity of its short process to the bone below and just in front of the external semicircular canal. The drum and ossicles are of course not removed, but left *in situ*. The middle ear is gently but thoroughly syringed. An L-shaped meatal flap is cut, as in a radical operation, the cartilage removed and the flap is sutured to the temporal fascia. The mastoid wound and antrum region are packed snugly, thereby furnishing support to the flap and the posterior wound is sutured.

8 East 54th Street.

TWO CASES OF PRIMARY JUGULAR BULB THROMBOSIS, NOT IN INFANTS.* **

DR. WILLIAM GINSBERG, New York.

In the practice of medicine it is important that the practitioner be taught to recognize the presence of a primary jugular bulb thrombosis, especially since this condition probably occurs more often than statistics would lead us to believe. It is, however, difficult for the practitioner to recognize this condition in its early manifestations, especially since he is accustomed to look upon jugular bulb and sinus thrombosis rather as a complication of an acute mastoiditis and not as primary infection. The jugular bulb and sinus may, however, become the seat of an acute infectious process without any manifestations of an intermediary mastoiditis.

The diagnosis of primary jugular bulb thrombosis depends essentially upon three factors, namely, 1, a sepsis which cannot be explained by any other demonstrable lesion; 2, a purulent otitis media; and 3, a positive blood culture. The presence of a positive blood culture is, however, not a constant factor, for even in cases in which a thrombus of the jugular bulb is present, the blood culture is not always positive at the first examination. This may be due to the fact that the blood culture may have been taken before a bacteremia had been established, or that the bacteria are in the blood in such small numbers that they are not found in the small amount of blood taken for the culture. It may also be that there may be an uninjected obturating clot below the infected thrombus, thus preventing the bacteria from entering the circulation. The best time to take a blood culture is at the height of a rise in temperature, for very often bacteria are disseminated into the blood stream from an infective focus only at certain intervals which manifest themselves clinically by chills, sweats, and very high temperature.

It has been my good fortune to follow the complete course of two cases of primary jugular bulb thrombosis within the past six months.

Case 1: S. F., age 19 years, admitted to the service of Dr. Samuel J. Kopetzky at the Beth Israel Hospital on Nov. 5, 1924, complaining of a discharge from the right ear, fever, and pain in the

Editor's Note: This mss. received in The Laryngoscope Office and accepted for publication June 24, 1925.

*From the Oto-Laryngological Department of the Beth Israel Hospital.

**Read before the Section on Otology, New York Academy of Medicine, May 8, 1925.

left chest anteriorly. His family and past history were negative. His present illness began two weeks before admission, when the patient complained of malaise and loss of appetite. These symptoms persisted for one week, accompanied by a low grade fever. At the end of a week the patient began to complain of a sharp pain in the right ear. The following day a right myringotomy was done and pus was found. His temperature that day rose to 105.6° and he entered Beth Israel Hospital on the following morning. At the time of admission to the hospital he complained of sharp pain in the anterior part of the left chest, aggravated by deep breathing. There was no history of cough or headache.

Physical examination on admission revealed a poorly nourished and acutely ill patient. There was a systolic murmur at the apex which was transmitted to the left axilla. The heart was not enlarged. Moist rales were present at the bases of both lungs posteriorly, and the pharynx was markedly congested. Aural examination revealed an absolutely normal condition of the left drum and mastoid region. The right drum was congested and there was a moderate purulent discharge. Deep pressure over the mastoid elicited a moderate amount of pain. The urine on admission was negative and the blood count showed 4,000,000 red cells with a hemoglobin of 90 per cent; 19,000 white cells with 90 per cent polymorphonuclears. The temperature was 103.8°, pulse 88, and respirations 36. Immediately after admission the temperature rose to 106.4°. Culture of the pus from the right ear showed the presence of streptococcus hemolyticus. A lumbar puncture was done and 10 c.c. of clear fluid under slightly increased pressure was removed. This fluid contained thirty cells per cubic centimeter, of which 90 per cent were polymorphonuclears. Culture of the fluid was negative. Blood Wassermann and chemistry were negative. Blood culture on the day of admission was negative. X-ray showed a clouding of the left mastoid cells, the right cells being negative. There was a slight clouding of both frontal sinuses.

It did not seem offhand that the local condition of the ear could account for the extreme prostration and high temperature of the patient, and in view of the presence of a pharyngitis and bronchitis, a tentative diagnosis of a beginning pneumonia was made by all except Dr. Kopetzky, who claimed that it was a primary bulb thrombosis in spite of the negative blood culture. On the following day the patient developed a chill and a temperature of 106° and Dr. Kopetzky advised immediate operative interference. The operation was performed by one of the staff adjuncts, who opened the

right mastoid and found the cells sclerosed. The sinus and dura were not exposed, the operator being misled by the evidently negligible gross pathology in the mastoid cells and believing the condition to be pulmonary in origin. The patient's temperature following operation ranged between 99.4 and 101° until the third day, when it rose to 104,° and thereafter ran a septic course ranging between 98 and 105,° accompanied by chills at irregular intervals. Daily blood counts showed a red cell count of approximately 4,000,000 cells with a hemoglobin of 75-85 per cent. The white cells ranged between 10,000-19,000 with 70-85 per cent polymorphonuclears. Blood cultures on the third, fifth, ninth and eleventh days following operation were sterile. Dr. Kopetzky advised immediate exploration of the sinus and jugular bulb, but the parents of the patient objected to further surgical intervention. On the seventeenth day following operation the parents consented to a secondary operation, which was performed by Dr. Kopetzky. The right sinus was exposed and plugged off above and below. The sinus was then opened and a thrombus was found therein occluding it down to the jugular bulb. The condition of the patient at this time was extremely poor and it was thought inadvisable to subject him to a prolonged anesthesia. In view of this fact, as much of the thrombus as possible was removed in the hope that he would rally after the operation and at some future date be better able to withstand a second exploration of the sinus and bulb. The right internal jugular vein was then ligated.

Blood culture taken two days after the second operation revealed the presence of streptococcus hemolyticus one colony to the plate, and ten days later showed the same organism one hundred colonies to the plate. The patient was then given transfusions of 300 c.c.m. of blood at frequent intervals. The temperature following this operation ranged between 100-103° and the patient was very drowsy and complained of pain over the right side of the head. It was then decided to again explore the sinus, and on the ninth day following the second operation the sinus was again explored and a thrombus was found at the jugular bulb. The sinus was also cleaned out posteriorly until moderate bleeding ensued. The temperature following this immediately began to drop until it reached normal on the seventh day following operation and remained there until the patient's discharge fifteen weeks after admission. Subsequent blood cultures were all sterile.

The eye grounds revealed an interesting picture, being normal on admission and remaining so for one month. A bilateral choked

disc was then noticed, which persisted for six weeks and then gradually began to recede until it had entirely disappeared at the time of discharge. It is rather hard to explain the mechanism in the production of this bilateral choked disc in view of the fact that there were no definite localizing signs, a normal cerebrospinal fluid, and no evidence of intracranial hemorrhage during or after the operation.

Case 2: S. V., age 8 years, admitted to the service of Dr. Samuel J. Kopetzky at the Beth Israel Hospital, complaining of fever, discharge from the right ear, and pain in the right hip joint. The past history was essentially negative except for a tonsillectomy and adenoidectomy performed two years before admission.

Two weeks before admission the patient complained of pain in the left ear. This subsided in a few days and then she began to complain of pain in the right ear. The right ear drum was incised with a resultant purulent discharge, which was followed by a septic temperature. The discharge gradually diminished in amount but the septic temperature persisted, ranging between 100-106°. Four days before admission the patient had a chill, which lasted for fifteen minutes. On the night before admission she began to complain of pain in the right hip.

Physical examination on admission was essentially negative except for marked pain in the right groin on manipulation of the right lower extremity. There was, however, no evidence of any bone involvement. The right ear drum was congested and there was a very slight purulent discharge, which on culture was found to be streptococcal in origin. There was no mastoid or jugular tenderness. The left drum was absolutely normal. The temperature was 102°, pulse 134, and respirations 26. The urine was negative and a complete blood count showed 4,000,000 red cells with a hemoglobin of 65 per cent, and 11,000 white cells with 59 per cent polymorphonuclears. Blood cultures taken on the day of admission showed the presence of streptococcus hemolyticus, two colonies per plate on two plates. X-ray of the mastoids revealed clouding of the right mastoid cells with normal cells on the left side, while the plates of the hips, sinuses, and chest were negative.

A diagnosis of primary bulb thrombosis was made and the patient was operated on by Dr. Kopetzky. The right internal jugular vein was first exposed, ligated in two places and the vessel cut between the ligatures. This was followed by a right mastoidectomy which revealed a hemorrhagic type of mastoiditis. The sinus was then exposed and plugged off above and below and the sinus opened.

On removing the upper plug there was free bleeding. The plug was then replaced and the lower one removed, but no bleeding followed. The lower end of the sinus was then probed and curetted down to the bulb, following which free bleeding resulted. The lower plug was then replaced and a third plug placed in the exposed sinus. The wound was packed and left wide open. A septic temperature ranging between 100-104° persisted for one week following the operation and then dropped to normal, where it remained. Two blood cultures following operation were sterile. The wound gradually healed and the patient was discharged as cured, twenty-three days following operation.

COMMENT.

In reviewing the foregoing cases, the following conclusions may be drawn:

1. Primary jugular bulb thrombosis may occur with or without the presence of an accompanying mastoiditis. In the absence of an involvement of the mastoid cells, the infection takes place through a probable dehiscence in the floor of the tympanic cavity into the jugular bulb.
2. In the presence of an unexplainable sepsis with a purulent otitis media, a primary jugular bulb thrombosis should be suspected, especially if the blood culture is positive. It therefore behooves the operator in such cases to explore the sinus and jugular bulb in addition to curetting the mastoid cells, regardless of whether or not there are any apparent destructive changes in the mastoid bone.

Beth Israel Hospital.

NEW INSTRUMENT: THE SINUSCOPE.

DR. MAXWELL MALTZ, New York City.

Efforts to examine the maxillary sinus to detect pathological processes of its mucosa date back to the advent of the modern cystoscope, and it was only a natural course of events that the observant rhinologist would take advantage of an electrical-optical instrument for his own specialty. Neither rhinologist nor oral surgeon gainsays the fact that a proper examination of the interior of the antrum without the necessity of an operation, if possible, is of considerable moment if he wishes to conscientiously and intelligently treat affections of this accessory sinus. Cystoscopy is of indispensable value to the modern urologist in his interpretation and treatment of pathological discrepancies in the bladder. And in the same way, "sinuscopy" if practical should be an important aid to the rhinologist in his treatment of disturbances in the antrum. The examination of the maxillary sinus shall receive the most consideration in this article since of all the nasal accessory sinuses it most frequently bears the burden of pathological changes.

It is known that often a needle puncture of the antrum will lead to an erroneous interpretation, for the return flow may be clear yet there may be polyps or thick pus in the cavity, pus that cannot come through so small an opening. The value of a direct examination of this accessory sinus is thus apparent.

The X-ray examination is also of definite importance to the nose and throat surgeon. In this particular field the author has had considerable experience here and in the important ear, nose and throat clinics of Europe, where he has demonstrated and used his own X-ray methods (*THE LARYNGOSCOPE*, July, 1924). He has seen a few thousand cases and there is no doubt that with proper technique the developed X-ray plate will reveal pathological changes in the accessory sinuses if there be any, but unfortunately this is only a general admonition of the changes going on. Though occasionally polyps and dental cysts could be demonstrated, it was never really definite, but a matter of conjecture. The X-ray plate cannot inform the surgeon of the true character of the lesion, but is the harbinger of bad news. And that is all.

Since the X-ray examination is so important an aid to the rhinologist, a direct examination of the maxillary sinus, if practical, should

be of extreme importance since changes in the mucosa can be readily visualized. Time and time again the rhinologists have reported their efforts to examine the antrum of Highmore and different electro-optical instruments were used and here and abroad the process has generally been called antroscopy. But the great majority of nose and throat surgeons have abandoned this method of examination because no real small instrument was manufactured to make this procedure nothing more than a diagnostic puncture, for the use of bulky optical instruments is an operation in itself. In order to make sinuscopy or the procedure of examining the maxillary sinus practical and simple, two factors must be considered: 1, the instrument devised must be as small as possible so as not to produce too much trauma; 2, its optical system must be such that a good observation of the mucous membrane can be had even if the prism of the instrument be held directly against the mucous membrane. One should see clearly and distinctly when the instrument rests upon any part of the mucosa. And here was the trouble, outside of the bulk of the instrument. The author has kept these important factors in mind and after a year's experimentation has perfected the smallest optical instrument ever made and still very practical and easy to use.

The success of examining the maxillary sinus depends upon the production of the least possible trauma which in itself is dependent upon the calibre of the instrument. A trocar and canula is used so that after the puncture, the optical instrument fits into the canula. The smallest instruments made heretofore averaged from 4 m.m.-3.5 m.m. in diameter. The author's instrument, "The Sinuscope", is the smallest ever made and is only 2.6 m.m. in diameter. The diameter of the optics is 1.5 m.m., and the remarkable thing about this instrument is that, despite its very small calibre, one sees even more distinctly than with the older instruments. This is attributable to the fact that the author has used a new optic for his instrument, called at present "the lupus optic". This optic is specially constructed to see objects distinctly even when held directly against the object, an advantage over the older optical systems. Besides, since it is essential to obtain a good view of the whole of the maxillary sinus, the author has made use of a "*prograde*" prism. This prism is so constructed that one can see 20° more forward than with that of the other instruments. And thus no part of the antrum is overlooked. The image is slightly magnified right sided and upright and interpretations are easy. Besides, to make the procedure even still more practical, the author has made use of his colored dioptric glass filters, a new principle. Prof. Ringleb has been using colored

glasses for cystoscopy, but after considerable experimentation with differently colored optical lenses, the author has ascertained that sinuscopy with the aid of a green glass filter of very thin calibre brought polypoid degenerations and mucopurulent discharges forward and better to view and threw the rest of the mucous membrane out of view. In other words, pus and polyps in the maxillary sinus are more readily discernible with the aid of the green glass. And if one uses the author's mixed colored glass filter, one-half green, one-half blue, an even greater plastic effect is obtained for the polyps and purulent discharge stand out even more prominently. But to train one's eye it is advisable at the beginning to use the simple green glass. On the other hand a yellow lens will bring the inflamed mucous membrane to better view and will throw all else in the background. For cystoscopy Prof. Ringleb uses a blue glass filter for purulent processes but according to the author's experience the green glass or the green-blue glass filter is far superior to the blue lens. The author has made a preliminary experimentation with these colored lenses on over 200 cadaver cases and their value was definitely demonstrated. And just to digress for a moment, the author is at present using this idea of colors in making colored laryngeal and nasopharyngeal mirrors, the green to bring to better view purulent processes in the larynx, and pharynx, and the anemia of tubercular origin; the yellow, for inflammations. A blue mirror is constructed for dental use.

TECHNIQUE OF USING SINUSCOPE.

To avoid blood particles from falling upon the prism or bulb, a trocar and canula are used before introducing the Sinuscope into the antrum. The maxillary sinus is penetrated by means of the trocar and canula, the trocar is removed and the Sinuscope is introduced through the canula. The internal diameter of the canula is 2.6 m.m. All the instruments are straight, making the different procedures very simple. To the canula is attached a removable hand grip facilitating the examination of the antrum, since the canula can be held in place with one hand during the process of sinuscopy. And in order that neither canula nor Sinuscope move too readily when the latter is inserted into the antrum, the diameter of the caudal end of the canula can be narrowed by means of a key so that the optical instrument fits snugly and firmly into the canula. Thus unnecessary movements of the instruments are avoided during the examination.

The technique of introducing the Sinuscope is simple and one of two procedures can be employed:



Fig. 1. a. Sinuscope. b. Colored glass filter.

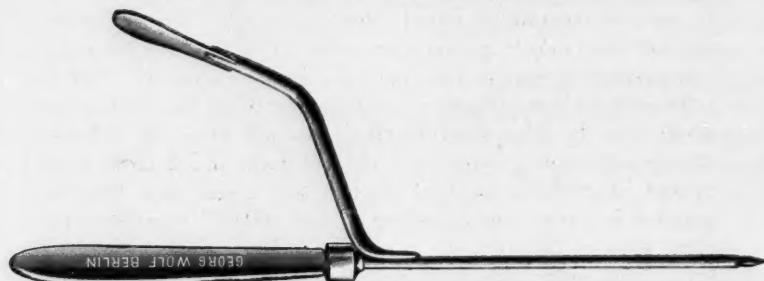


Fig. 2. Trocar and canula with grip.

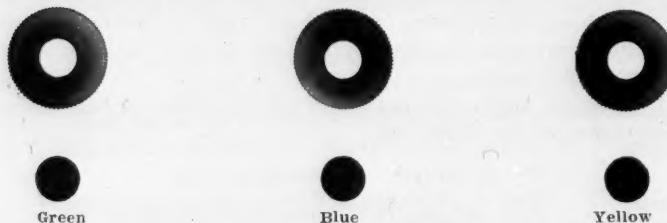


Fig. 4. Rheostat.

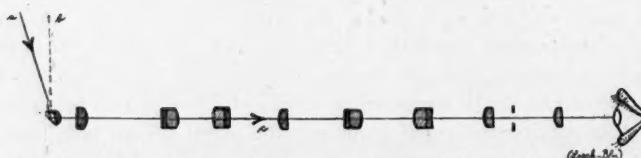


Fig. 5. Optical system of sinuscope (diagrammatic). Arrow A indicates the visual field (prograde) of sinuscope. One can thus see 20° more anteriorly than with older prism, whose visual field is represented by dotted line 3. AC is the direction in which the rays of light pass from object to eye.

1. The Canine Fossa Route: The mucosa overlying the canine fossa close to the bone of the facial wall of the maxillary sinus is injected with 1 per cent novocain solution. After ten to fifteen minutes, by use of the index finger of the left hand, the trocar and canula are introduced into the antrum by applying moderate pressure with the palm of the right hand held against the head of the trocar. The surgeon should direct the trocar against the thinnest portion of the facial wall of the antrum. Since the anterior antral wall is directed downward and outward, to facilitate the penetration of the antrum the trocar should be directed slightly outward and not in the direction of the nasal fossa. One also must keep in mind the exit of the infraorbital nerve and should not penetrate the maxillary sinus too high up in the facial wall. Once the antrum is entered, the trocar is withdrawn, the canula being steadied by holding its handle with the left hand, and then the Sinuscope is introduced through the canula and the antrum is inspected first without the colored glass filters, then with them. If desirable, the antrum can be irrigated at first. If penetration of the sinus is difficult, a slight tap with a mallet on the head of the trocar will render the procedure more easy.

2. The Nasal Route: The anterior third of the inferior meatus is packed with 5-10 per cent cocaine solution adrenalized. After waiting fifteen minutes the packing is removed. The trocar and canula should then be inserted into the anterior part of the inferior meatus, care being taken that the point of the trocar rests against the anterior border of the inferior turbinate at the point where it joins the outer nasal wall. The instrument is directed at an angle of about 30° to the outer nasal wall, the head of the trocar pointing slightly upward and outward. The left hand is placed around the head of the patient for counter pressure and then the lateral nasal wall is punctured at its most anterior-superior part by directing a moderate degree of pressure with the palm of the right hand against the head of the trocar. Here again the mallet can be very effectively used if too much resistance is encountered. On entering the maxillary sinus the trocar is withdrawn and the same procedures are followed as outlined in the method of penetrating the antrum via the canine fossa route. If the surgeon desires he can directly anesthetize the mucous membrane of the anterior third of the inferior meatus with a 1 per cent novocain solution adrenalized, instead of using the cocaine packing. After waiting fifteen minutes the antrum can then be entered.

The technique is simple either by the canine fossa route or by the nasal route, but the author prefers the former, since by this procedure one can more readily examine the ostium or osti of the sinus. One cannot, with a straight electro-optical instrument, visualize the ostia by way of the nasal route particularly when the medial wall of the antrum is more convex than otherwise.

The instrument is called Sinuscope because the author has been making an effort to perfect an optical instrument that could be used not only for the maxillary sinus, but also for the opened sphenoidal or frontal sinus. With this Sinuscope the author was able to examine the mucosa of the sphenoidal and frontal sinuses on numerous cadavers, once these sinuses were slightly opened. How far the Sinuscope can be used practically on the living remains to be seen, since the ultimate success of employing this instrument for the sphenoidal and frontal sinuses will depend on how far one is able to control bleeding. At present the author is trying to perfect techniques that will make the procedure of examining these two sinuses practical. Two other models of this Sinuscope are made. One has the electric bulb curved 18° so that it be slightly easier to enter the frontal sinus once the aggar nasi is removed. But in order to avoid too much trauma while examining the maxillary sinus, a third model was devised by the author. This model has the same curve of 18° but has openings above and below for the electric bulb and optical prism. The whole optical system can be rotated by just turning the observation telescope, though the rest of the external part of the instrument remains stationary. Thus when examining the maxillary sinus with this model of the Sinuscope, the instrument remains stationary. The upper part of the antrum is first visualized and then by just turning the head of the instrument 180° one can visualize the lower part of the sinus. These openings above and below for the prism and electric bulb avoids unnecessary turning of the whole instrument while examining the antrum. To both of these curved instruments are attached a trocar and flexible canula. But for all practical purposes the straight model of the Sinuscope is the best because it is the easiest to work with and the least expensive.

The author believes that the Sinuscope is the most practical instrument constructed to examine the maxillary sinus because of its smallest possible calibre and because of its optical components. And just because of its very small diameter it naturally becomes the handiest instrument to use for ordinary nasal endoscopy. And while examining the ethmoidal ostia, the frontal sinus ostium, the antral,

or sphenoidal ostia, or discharges in the middle meatus or such, the value of the colored glass filters becomes apparent. The Sinuscope is also very useful to examine the ear after a radical mastoid operation, to study the healing and dermatization of the cavity.

Since the electric bulb of the instrument stands but three volts an ordinary battery can be used, to which is attached the illustrated small rheostat, and thus the amount of voltage can be easily regulated.

IMPRESSIONS.

1. The Sinuscope, because of its calibre and optical system, is the best possible instrument for examining the maxillary sinus. And this method of examination offers invaluable aid in diagnosis, relegating the operative case from the non-operative case.

2. Proper X-ray examination is very valuable, but the use of the Sinuscope furnishes more definite data. The X-ray plate warns the surgeon that there is some pathological change going on in the sinus if the plate evinces a clouding of the sinuses. The cause of the clouding is definitely determined by the use of the Sinuscope.

3. The use of the glass filters enhances the value of the Sinuscope, since the different filters bring out to more advantage the different pathological processes.

4. The size of the Sinuscope, together with the use of the glass filters make the instrument the most desirable nasal endoscope.

The Sinuscope was demonstrated in the more important rhinological clinics of Germany, in Naples, Italy; Amsterdam, Holland; London, England; Paris, France, and at the German Ear, Nose and Throat Congress in Munich, May 27-30, 1925.

The instruments are manufactured by Georg Wolf, 18 Karlstrasse, Berlin, Germany. The lupus optic was developed by Mr. Loeck, physicist of the concern.

LAVORIS
ANTRUM

The cleansing, stimulating, anti-septic and deodorant qualities of Lavoris are readily observed upon its employment as a medium of lavage of both acute and chronic suppurative conditions of the maxillary sinuses.

LAVORIS CHEMICAL CO.
MINNEAPOLIS, MINNESOTA
TORONTO, ONTARIO

THE
LARYNGOSCOPE
\$6.00 PER YEAR.

